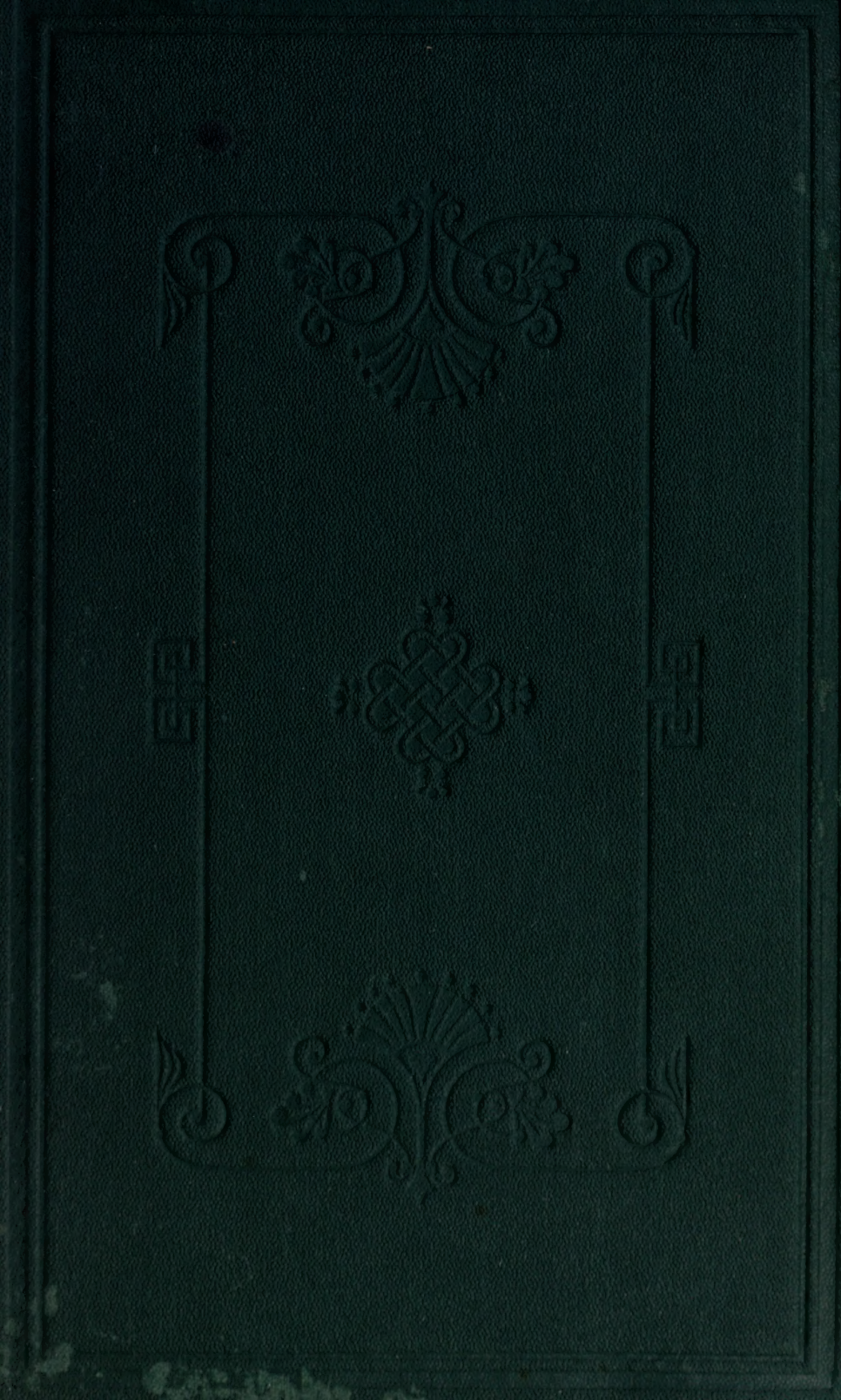


YEAR-BOOK OF PHARMACY.


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YEAR-BOOK OF PHARMACY

COMPRISING

ABSTRACTS OF PAPERS

RELATING TO

PHARMACY, MATERIA MEDICA, THERAPEUTICS, & CHEMISTRY

CONTRIBUTED TO BRITISH AND FOREIGN JOURNALS

FROM JULY 1, 1869, TO JUNE 30,

1870.

WITH THE

PROCEEDINGS

OF THE

BRITISH PHARMACEUTICAL CONFERENCE

AT THE

SEVENTH ANNUAL MEETING

HELD AT

LIVERPOOL

SEPTEMBER, 1870.

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YEAR-BOOK OF PHARMACY.

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THE

BRITISH PHARMACEUTICAL CONFERENCE.

AN ORGANIZATION ESTABLISHED IN 1863 FOR THE ENCOURAGEMENT OF PHARMACEUTICAL RESEARCH, AND THE PROMOTION OF FRIENDLY INTERCOURSE AND UNION AMONGST THOSE ENGAGED IN PHARMACY.

The most important ways in which a member can aid the objects of the Conference are by suggesting subjects for investigation, working upon subjects suggested by himself or by others, contributing information tending to throw light on questions relating to adulterations and impurities, or collecting and forwarding specimens whose examination would afford similar information. Personal attendance at the yearly gatherings, or the mere payment of the annual subscription, will also greatly strengthen the hands of the executive.

A list of subjects suggested for research is sent to members early in the year. Resulting papers are read at the annual meeting of the members; but new facts that are discovered during an investigation may be at once published by an author at a meeting of a scientific society, or in a scientific journal, or in any other way he may desire; in that case, he is expected to send a short report on the subject to the Conference.

The annual meetings are held in the provinces, and usually at the time and place of the visit of the British Association. That for 1871 will be held in Edinburgh, in the month of August.

Gentlemen desiring to join the Conference can be nominated at any time on applying to either of the secretaries or any other officer or member. The yearly subscription is five shillings. Further information may be obtained from the secretaries.

Professor Attfield, 17, Bloomsbury Square, London, W.C.
Richard Reynolds, F.C.S., Briggate, Leeds.

THE YEAR-BOOK OF PHARMACY.

For 1870 and in future years the Conference will issue to members a volume of about 600 pages, containing the proceedings at the yearly meeting, and an annual report on the Progress of Pharmacy, or Year-book, which shall include notices of all pharmaceutical papers, new processes, preparations, and formulæ published throughout the world. The necessary funds for accomplishing this object can probably be obtained without making any charge for the volume in addition to the annual subscription (five shillings), if a large number of members be enrolled. The Executive Committee therefore call on every pharmacist—principal, assistant, or pupil—to offer his name for election, and on every member to make an effort to obtain more members. The price of the Year-book to non-members will be seven shillings and sixpence. The constitution and rules of the Conference, and a form of nomination for membership, will be found at page 301.

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PREFACE.

An attempt has been made in these pages to meet an English want by presenting a record of the Pharmacy of the past year. It has become an impossible task for each individual to follow the progress of our art, even as it exists amongst ourselves, as journals of all descriptions, reflecting every shade of interest, crowd upon his notice thick as the leaves in Vallombrosa.

Still less can he hope, trusting to his personal resources, to have a moderate acquaintance with the thought and experience of those who both think and feel exactly like ourselves, but who speak in languages different to our own.

It has been the earnest wish of the British Pharmaceutical Conference to link together, with some degree of systematic arrangement, various ideas, French, German, American and English, bearing on "our common mistress, Pharmacy."

Mutually we know far too little about each other; and this we must, though reluctantly, confess, that whereas French pharmacy is tolerably familiar to us as Englishmen, and our periodicals bristle with elaborate statements bequeathed by our German friends, yet of American pharmaceutical practice our knowledge is defective. We cordially offer most sincere respect to the teaching and common sense of our transatlantic fellow workers.

We have endeavoured to lessen our own ignorance with regard to the trade and science of the United States, and to communicate the result of such researches, hoping that the reader may learn something about "Elegant Pharmacy," "Divided Medicines" and "Fluid Extracts," though he may not be induced to the extent his American brethren would like, to bow down and worship Glycerine.

Amongst the most interesting contributions will be found some notices on Materia Medica, specially on the cultivation of the Cinchonas. The researches of Dr. Richardson would of themselves fill a volume; but they are so generally known, that fuller details than those given here need scarcely be regretted. The therapeutic

applications of Chloral Hydrate are in their infancy, and the abundant references to this substance must be considered as of historical value rather than as definite conclusions to regulate the dispenser. On the one hand we have the late Sir James Simpson with (possibly) heroic doses, stating that it is never better administered than in solution; on the other we have Limousin, with his capsules and inferior dose, claiming as an advantage that the Hydrate so exhibited was in a solid form. Midway stand London West-end practitioners ordering fifteen grains, dissolved in water and disguised with orange. Next year we may speak with confidence as to its medical and chemical relations.

Great difficulty has been felt in ascertaining the exact boundary lines which mark off Pharmacy, Chemistry and Materia Medica. Often one is so much like the other that an accurate decision as to their respective places has caused anxiety. A grateful feeling has been inspired by the discovery that all manuals of reference hitherto published have had the same dilemma to encounter.

The chief object aimed at in this compilation is to chronicle in brief sentences and narrow compass the labours of the last twelve months. The design has not been hastily conceived, nor has it been adopted without due consideration. A reasonable hope is entertained that it may prove useful.

A knowledge of Continental Pharmacy is essential to every Pharmacist; it is an element of trade success. All international intercourse is good, and tends to upset vain self-confidence and to diminish rust. Should this little volume teach us to learn from others, and in return to lend them our assistance; should it widen our sympathies and bind us in closer bonds of fellowship; and should it promote the usefulness and prosperity of our own members,—the earnest desire of the British Pharmaceutical Conference will have been fulfilled.

*** It is due to the members of the Conference to state that the non-appearance of this compendium in October was owing to the serious illness of the editor, Mr. John Cargill Brough. Hoping against hope, further arrangements were delayed until help became essential. The work in its present form is the joint production of the editor and Mr. Joseph Ince.

YEAR-BOOK OF PHARMACY.

WEIGHTS, MEASURES, AND ARITHMETICAL FORMULÆ

JOHN CARGILL BROUGH.

THE equivalents of the weights and measures of various denominations are expressed in terms of the ordinary British and Metric Systems, and, in the case of measures of capacity, the different temperatures at which the standards are adjusted have been duly considered.

WEIGHTS.

		Grains.		*Grammes.*	
		0·0154	=	0·0010	= 1 milligramme.
		0·1543	=	0·0100	= 1 centigramme.
B.P.	1 grain	= 1·0000	=	0·0648	
		1·5432	=	0·1000	= 1 decigramme.
		15·4323	=	1·0000	= 1 gramme.
	1 scruple	= 20·0000	=	1·2960	
	1 drachm	= 60·0000	=	3·8879	
		154·3235	=	10·0000	= 1 decagramme.
B.P. Avoirdupois.	1 ounce	= 437·5000	=	28·3495	
U.S.P. Troy . .	1 ounce	= 480·0000	=	31·1035	
		1543·2349	=	100·0000	= 1 hectogramme.
U.S.P. Troy . .	1 pound	= 5760·0000	=	373·2420	
B.P. Avoirdupois.	1 pound	= 7000·0000	=	453·5926	
		15432·3487	=	1000·0000	= 1 kilogramme.

In the British Pharmacopœia the weights directed to be used in the preparation of medicines are the *grain*, the avoirdupois *ounce* (437·5 grains), and the avoirdupois *pound* (16 ounces, or 7000 grains). Medical men are urged to avoid the use of the terms "ounce" and "pound" with reference to any other weights. In prescribing the physician may still use the symbol of the old *scruple*, ℈, to represent 20 grains, and that of the old *drachm*, ʒ, to represent 60 grains.

In the United States Pharmacopœia the old apothecaries' weight is retained. Its terms are the *grain*, the *scruple* (20 grains), the *drachm* (3 scruples or 60 grains), the troy *ounce* (8 drachms or 480 grains), and the troy *pound* (12 troy ounces, or 5760 grains).

In the French Codex all quantities by weight are uniformly expressed in *grammes*.

By "The Metric Weights and Measures Act, 1864," the *kilogramme* is declared to be equivalent to 15432·3487 British grains, and the equivalents given in the preceding table have been worked out in accordance with this relation, to four places of decimals.

MEASURES OF CAPACITY.

			Grain-measures of Water.		Cubic centimetres, = *Grammes.*	
			at 62° F.	*at* 39·2° F.	*at* 39·2° F.	
B.P.	1 minim	=	0·9115 =	0·9130 =	0·0592	
U.S.P	1 minim	=	0·9492 =	0·9508 =	0·0616	
Griffin.	1 septem	=	7·0000 =	7·0116 =	0·4543	
Sutton.	1 decem	=	10·0000 =	10·0166 =	0·6491	
			15·4067 =	15·4323 =	1·0000 = 1	millilitre.
B.P.	1 fluid drachm	=	54·6875 =	54·7784 =	3·5496	
U.S.P.	1 fluid-drachm	=	56·9509 =	57·0456 =	3·6965	
			154·0674 =	154·3235 =	10·0000 = 1	centilitre.
	1 cubic inch	=	252·4580 =	252·8777 =	16·3862	
B.P.	1 fluid ounce	=	437·5000 =	438·2273 =	28·3967	
U.S.P.	1 fluid ounce	=	455·6076 =	456·3650 =	29·5720	
			1540·6738 =	1543·2349 =	100·0000 = 1	decilitre.
Griffin.	1 decigallon	=	7000·0000 =	7011·6364 =	454·3467	
U.S.P. o.w.m.	1 pint	=	7289·7212 =	7301·8392 =	473·1515	
B.P. Imperial.	1 pint	=	8750·0000 =	8764·5454 =	567·9333	
		=	15406·7375 =	15432·3487 =	1000·0000 = 1	litre.
U.S.P. o.w.m.	1 gallon	=	58317·7700 =	58414·7138 =	3785·2121	
B.P. Imperial.	1 gallon	=	70000·0000 =	70116·3636 =	4543·4668	
	1 cubic foot	=	436247·4296 =	436972·6201 =	28315·3670	

In the British Pharmacopœia the imperial measure, subdivided into fluid-ounces, fluid-drachms, and minims, is adopted for the measurement of liquids. The *imperial gallon* is the measure of 70,000 grains of distilled water at 62° F., and is equivalent to 277·27384 cubic inches; the *imperial pint* is one-eighth of a gallon; the *fluid-ounce*, one-twentieth of a pint; the *fluid-drachm*, one-eighth of a fluid-ounce; the *minim*, one-sixtieth of a fluid-drachm.

In the United States Pharmacopœia the gallon and the pint of the old wine measure with their pharmaceutic divisions are adopted. The *wine gallon* is equivalent to ·833111 of an imperial gallon, or to 231 cubic inches nearly; the *wine pint* is one-eighth of this gallon; the corresponding *fluid-ounce*, one sixteenth of the pint; the *fluid-drachm* one-eighth of the fluid-ounce; the *minim*, one sixtieth of the fluid-drachm.

In the French Codex the litre and its decimal divisions are occasionally mentioned, but for the preparation of medicines *weighed quantities* of liquids, expressed in grammes, are invariably ordered. The *millitre* corresponds to the *cubic centimetre;* the *litre* to the *cubic decimetre.*

For volumetric analysis the British Pharmacopœia adopts two units of measurement, namely: the *grain-measure*, which is defined as the volume of a grain of distilled water at 60° F.; and the *cubic centimetre*, or the volume of one gramme of distilled water at 4° C. (39·2° F.). Mr. Griffin recommends as a unit of volume the *septem*, which is the ten-thousandth part of an imperial gallon. The measure of 1000 septems is called by this author the *decigallon*, and is equivalent to one-tenth of an imperial gallon. In Mr. Sutton's work on volumetric analysis the cubic centimetre is adopted as a unit, and subordinately the *decem*, which is the measure of 10 grains of water at 62° F.

The standards of the British Imperial Measure are adjusted at 62° F., while those of the French Metric Measure are adjusted at the temperature of the maximum density of water, 4° C. or 39·2° F. This discordance between the two systems has been disregarded by the compilers of the British Pharmacopœia. In the table indicating the relation of the metric measures to the officinal measures the cubic centimetre and the litre are said to be equivalent to 15·432 and 15432·348 "grain measures" respectively; but these grain-measures represent grains of water at 4° C., and do not correspond to the "grains of water" employed in another table to indicate the relation of measures to weights. According to "The Metric Weights and Measures Act, 1864," the litre is equivalent to 1·76077 imperial pints, and as the pint contains 8750 grains of water at 62° F., the litre will contain 1·76071 × 8750 = 15406·7375 grains of water at the same temperature.

In our table the relative values of the various measures named are expressed by numbers denoting grain-measures of water at each standard temperature. The first series of equivalents is consistent with the declaration that the imperial gallon is the measure of 70,000 grains of water; the second series, with the proposition that the cubic centimetre and the litre represent respectively the volumes of a gramme and a kilogramme of water. The numbers given in our table have been carefully calculated to four places of decimals from the following data:—1 *imperial gallon* = 70,000 grain measures of water at 62° F. = 277·27384 cubic inches; 1 *gallon, old wine measure* = ·833111 of an imperial gallon; 1 *litre* = 1000 gramme measures of water at 4° C. = 1·76077 pints imperial measure.

MEASURES OF LENGTH.

		Inches.		*Centimetres.*	
		0·03937	=	0·10000	= 1 millimetre.
1-12th of an inch	= 1 line	= 0·08333	=	0·21166	
		0·39371	=	1·00000	= 1 centimetre.
	1 inch	= 1·00000	=	2·53995	
		3·93708	=	10·00000	= 1 decimetre.
	1 foot	= 12·00000	=	30·47945	
	1 yard	= 36·00000	=	91·43835	
		39·37079	=	100·00000	= 1 metre.

In approximate measurement, 1 inch may be taken as the equivalent of 25 millimetres, and 10 inches as the equivalent of 25 centimetres.

APPROXIMATE WEIGHTS AND MEASURES.

The extended decimal numbers of the preceding tables are too unwieldy to be used generally in practical calculations for the conversion of the weights and measures of one system into those of another. We therefore propose a series of convenient numbers for ordinary pharmaceutic purposes. The differences between these numbers and the true equivalents are very small, often scarcely appreciable with the balances and measures commonly used in pharmacy.

Metric.		*Avoirdupois.*	*Difference.*
1 gramme	=	15½ grains	— ·0677 grain (about seven hundredths).
1 kilogramme	=	35¼ ounces	+ 10·4737 grains (about 10½ grains).
Avoirdupois.		*Metric.*	
1 grain	=	65 milligrammes	— ·2000 milligramme (one-fifth of a milligramme).
1 ounce	=	28¼ grammes	+ ·0995 gramme (about one-tenth of a gramme).
1 pound	=	453½ grammes	+ ·0926 gramme (about one-tenth of a gramme).
Metric.		*Imperial.*	
1 cub. centim.	=	17 minims	— ·0974 minim (about one-tenth of a minim).
1 litre	=	35¼ fluid-ounces	— ·0346 fluid-ounce (about 16 minims).
Imperial.		*Metric.*	
1 fluid-drachm	=	3½ cub. centim.	+ ·0495 c. c. (about five-hundredths of a c. c).
1 fluid-ounce	=	28½ cub. centim.	— ·1033 c. c. (about one-tenth of a c. c).
1 pint	=	568 cub. centim.	— ·0653 c. c. (about six-hundredths of a c. c).

The following simple rules will be found exceedingly useful, and

should be remembered by those who are employed in the laboratory or at the dispensing counter:—

To convert Metric Grammes into British Grains.—*Multiply by* 154, *and cancel the last figure of the product.*

	Grammes.			*Grains.*
Examples:—	3 × 154	=	46,2 or	46
	26 × 154	=	400,4 or	400
	1000 × 154	=	15400,0 or	15400

The results thus obtained come very near to the true equivalents. With 1000 grammes, or 1 kilogramme, the difference does not amount to 33 grains. For the more accurate estimation of small quantities, the cancelled figures, which represent *tenths of a grain*, should be taken into account; thus 3 grammes would be equal to 46 grains and two-tenths of a grain.

To convert British Grains into Metric Grammes.—*Multiply by* 65, *and cut off three figures on the right of the product.*

	Grains.			*Grammes.*
Examples:—	437 × 65	=	28,405 or	28
	7000 × 65	=	455,000 or	455

The results thus obtained, with large numbers, are sufficiently accurate for most practical purposes. The error with 7000 grains, or 1 pound, does not amount to $1\frac{1}{2}$ grammes. The figures cut off represent *milligrammes*, and should be taken into account when the number of grains is small; thus 437 grains will be more accurately represented by 28 grammes and 405 milligrammes. A product containing less than four figures necessarily expresses the number of milligrammes: thus with 1 grain, 1 × 65 = 65 milligrammes; with 15 grains, 15 × 65 = 975 milligrammes.

To convert Cubic Centimetres into Imperial Fluid-drachms.—*Multiply by* 28, *and cancel two figures on the right of the product.*

	Cub. centim.			*Fluid drachms.*
Examples:—	568 × 28	=	159,04 or	159
	1000 × 28	=	280,00 or	280

The results thus obtained come very near to the true equivalents. With 1000 cubic centimetres, or 1 litre, the difference does not amount to $1\frac{3}{4}$ fluid-drachms. The cancelled figures represent *hundredths of a fluid-drachm*, and should be taken into account when the equivalents of small quantities are determined.

To convert Imperial Fluid-drachms into Cubic Centimetres.—*Multiply by* 355, *and cancel* 2 *figures on the right hand of the product.*

	Fluid drachms.			*Cub. centim.*
Examples:—	8 × 355	=	28,40 or	28
	160 × 355	=	568,00 or	568

The results thus obtained are very accurate. With 160 fluid-drachms, or 1 pint, the error does not amount to seven-hundredths of a cubic centimetre. The cancelled figures indicate *hundredths of a cubic centimetre*, and should be taken into account when the equivalents of small quantities are determined.

THERMOMETER SCALES.

Two thermometric scales are employed in Great Britain; namely, the scale of Fahrenheit, adopted in the Pharmacopœia, and the Centigrade scale, which is justly preferred by scientific chemists and physicists. The more important points in the two scales are indicated below:—

	Fahr.		*Cent.*
Boiling point of water under the normal atmospheric pressure .	212°	=	100°
Temperature at which the imperial measures are adjusted . .	62°	=	16·6°
Temperature at which specific gravity is usually determined . .	60°	=	15·5°
Temperature at which the metric measures are adjusted . . .	39·2°	=	4°
Melting point of ice, zero of Centigrade scale	32°	=	0°
Zero of Fahrenheit's scale	0°	=	—17·7°
Temperature at which mercury freezes, about	— 40°	=	—40°

To convert Fahrenheit Degrees into Centigrade Degrees.—*Subtract* 32, *multiply by* 5, *and divide by* 9. These operations are expressed in the following formula:—

$$C. = \frac{5\ (F. - 32)}{9}$$

To convert Centigrade Degrees into Fahrenheit Degrees.—*Multiply by* 9, *divide the product by* 5, *and add* 32. Or,—

$$F. = \frac{9\ C.}{5} + 32.$$

[In performing these operations, the *minus* sign must be taken into account. For example, 5° F. is converted into Centigrade degrees, thus,—

$$C. = \frac{5\ (5 - 32)}{9} = -15°.]$$

BAROMETER SCALES.

In England the height of the mercurial column in the barometer is usually expressed in *inches;* in France it is invariably expressed in *millimetres.* As many English scientific writers have adopted the metric measures, the following rules for converting millimetres into inches, and inches into millimetres, may be found useful:—

To convert Millimetres into Inches.—*Multiply by* 39371, *and point off six figures of the product as a decimal fraction.*

	mm.		*in.*
Examples:—	760 × 39371 = 29,921960	or	29·922
	762 × 39371 = 30,000702	or	30

To convert Inches into Millimetres.—*Multiply by* 254, *and point off in the product one figure, with as many more figures as there are decimal places in the number operated upon.*

	mm.		*in.*
Examples:—	29·922 × 254 = 760,0188	or	760
	30 × 254 = 762,0	or	762

Fractions may be disregarded when millimetres are used to express the height of the mercurial column.

SECTION I.

AMERICAN PHARMACY.

ABSTRACT FROM NOTES BY A LONDON PHARMACIST.

For convenience the rough value of American coinage is subjoined:—

1 dollar	= 4*s.*	5 dollars	= £1
2 ,,	= 8*s.*	100 ,,	= £20
3 ,,	= 12*s.*	500 ,,	= £100
4 ,,	= 16*s.*	1000 ,,	= £200

1 dollar = 5 francs. 1 cent = ½*d.* 25 cents = 1*s.* 50 cents = 2*s.*
100 cents = 4*s.* or 1 dollar.

RENT OF CHEMISTS' SHOPS IN BOSTON.

The annual rental of a first class corner shop in one of the best streets in the city is 7000 dolls., *i.e.* £1400; for a similar shop, not being at a corner, 5000 dolls., *i.e.* £1000. Such shops are new, handsome and spacious, but this rent only includes the shop, basement, and first floor. Pharmacists never live in their houses of business. For a small shop situated near the depôts in the centre of the city, say in the busiest parts of Washington Street, the rental paid is 5000 dolls. In second-rate streets 1000 dolls. to 2000 dolls. The general fitting up of a pharmacy is in white marble: the aërated water apparatus is an essential requisite.

In the public garden at Boston, there has lately been erected a small monument executed in stone, in exceedingly good taste, bearing

the inscription: "To Commemorate the Discovery that the Inhaling of Ether causes insensibility to Pain. First proved to the world at the Massachusetts General Hospital, in Boston; October, A.D. MDCCCXLVI." Erected by Thomas Lee, Citizen of Boston.

TRADE AND EDUCATIONAL PARTICULARS.

In America *physician* is a generic term for all medical men. A patient visiting a physician pays a fee of from two to five dollars; physicians who visit families send in their account twice a year. Any one can commence practice as a physician, but if without a diploma cannot recover fee by law, and in case of accident is severely dealt with. Most physicians are regularly qualified men, with the right of placing M.D. after their name.

Dispensing chemists are known to the general public as apothecaries, chemists, or druggists, or pharmacists. The term *apothecary* is preferred. They restrict the term *chemist* chiefly to analytical or manufacturing chemists; and the term *druggist* to wholesale druggists. Dispensing chemists are quite independent of the physicians, and carry on business without secret patronage or private arrangement.

[This is directly opposed to what has been represented as the practice in Canada.—*Ed.*]

In MASSACHUSETTS and in nearly the whole Union any one can open a chemist's shop, and write over it "apothecary;" but in a few States and cities, no one may dispense prescriptions, or sell poisons until licensed by some chartered Pharmaceutical Society. There are no apprentices to the trade; a boy of sixteen years of age is taken to learn the business on the understanding that he shall remain with his employer till twenty-one, but the contract is voluntary, and may be abruptly broken by either party. The boy pays no premium, but on the other hand immediately receives a salary. This is a national custom, as all boys of sixteen expect and are expected to support themselves. The salary for the first year is generally 100 dolls. out of the house. This is increased as he becomes useful or displays ability, till at twenty-one he generally receives 300 dolls. to 400 dolls. and is no longer called "a boy" but "a clerk." No term implying servitude would be tolerated by young America or employed by old America. A head clerk or manager, æt. 25 to 30, receives 1000 dolls. to 1200 dolls.; subordinates 500 dolls. to 700 dolls.; all out of the house. It is not the custom for either the principal or his employés to live at the house of business.

After a boy has passed through the rudiments, and is perfected in

the art of cleaning measures and mortars, dusting a fixed portion of the shop every morning, cutting labels, folding up parcels for stock, finishing off the proprietary medicines, and finally in making tinctures and pharmaceutical preparations,—at the age of nineteen he attends for two years the winter course of lectures, on chemistry, botany, materia medica, and practical pharmacy, at the Boston College of Pharmacy. These lectures are delivered in the evenings by experienced pharmacists of Boston, and by professors from Harvard University. The fees are generally paid by the employers. Examinations are afterwards held, and diplomas granted. At present attendance is voluntary, nevertheless large numbers of Boston young men attend regularly; and many from the country towns, animated by a thirst for knowledge, take situations in Boston for the special purpose of passing the examination. Connected with the college is a library, a small museum and a laboratory.

Last session a bill was introduced into the State Legislature for the purpose of giving pharmaceutical societies legal powers; but it came to nothing. New efforts are to be made next session.

Epsom salt, and senna leaves have almost fallen into disuse in Boston. They are considered to be rough and coarse remedies. Customers now inquire for "sugar-coated pills," or the "fluid extract of senna." More than 200 varieties of sugar-coated pills are sent out by the wholesale druggist in bottles containing 500, at the rate of 50c. to 1 doll. per 100.

The hours of business in Boston are from 8 a.m. to 9 p.m. On Sundays the door is open, and some one in attendance all day.

Wages of porters, 7 dolls., 10 dolls., to 12 dolls. Errand boys, 4 dolls. a week.

A large quantity of sodawater and other gaseous beverages is consumed in this city during the hot weather. The necessary apparatus is to be seen on many counters besides chemists': as confectioners, tobacconists, fruiterers, sweetmeat shops, oyster bars, and refreshment houses; so large sums are spent in these drinks. There is one store in the best situation in Boston that is well known to take 200 dolls., *i.e.* £40, a day during very hot weather.

In Boston it is the custom for a chemist to retain the prescription, and paste it in a book; the patient does not expect to have it returned to him. The books into which the prescriptions are pasted are very thick: in some cases thirteen inches wide across the back. But this custom is not without exception; one or two of the older shops adopt the English plan, and return the prescription.

Every apothecary or dispensing chemist, all over the Union, has

by Act of Congress to take out a licence annually to enable him to dispense prescriptions, sell medicines, and deal in proprietary articles, at the cost of ten dollars. If he deals in cigars and tobacco another licence is required at five dollars. Another still is necessary to permit him to deal in spirit of wine, wines and liquors, the annual cost is twenty-five dollars. Few take the tobacco, but all the spirit licence. The business resulting from this is not large nor important, and is never a leading feature of the shop except in the back streets and obscure neighbourhoods. Recourse is had to the chemist only in cases of sickness for good brandy and pure wines; but as his prices are higher than the usual dealers, the quantities bought are always small.

In Boston the dispensing prices are:—

Mixture, ℥vj., 75 cents to 1 dollar.
Mixture, ℥viij., 1 dollar to 1.25.

that is 12½ cents, or sixpence, per ounce.

Pills from Recipe.

Pills vj.	,,	1/ or 25 cents.
,, xij.	,,	40 cents.
,, xxiv.	,,	2 cents each.

At Buffalo, on the shores of Lake Erie, in New York county, having a population of 150,000, there are no schools of pharmacy, and no special educational resources available for the younger generation of chemists.

Milwaukie (*mill-waw'-key*, the accent on the middle syllable) is the commercial capital of Wisconsin, situated on the shores of Lake Michigan. There are twenty-five drug stores in Milwaukie; in all prescriptions are dispensed, and a select business carried on; a very small minority dealing in oils and colours. They all keep liquors for medicinal purposes. All the physicians write prescriptions, and none send out their own medicines; on the other hand, the chemist is careful to avoid prescribing. There are there no schools of pharmacy, no evening lectures, and no public laboratory; the nearest scientific instruction is to be had at Annarbor College in Michigan, where pharmacy is included in the course of instruction. No apprentices are taken, but a youth of about sixteen is engaged at a salary of two dollars a week, and for the first two years learns the art of cleaning measures, dusting bottles, sweeping out the shop, cleaning the shop window, and even cleaning the *outside* of the window in a crowded thoroughfare. His pay, if he shows aptitude for the business, is gradually raised to three or four dollars a week. After the two years

have expired, he is put behind the counter to sell patent medicines; in his leisure putting up the proprietary remedies of the house and helping in the laboratory. If he still shows an aptitude for the business, he is encouraged to read the Dispensatory or Pharmacopœia of the United States, and placed under the prescription clerk to make tinctures and ointments. Pills are rarely made in quantities now, they being supplied by the wholesale druggists, sugar-coated, according to recognised formulæ, which are printed on the labels of the bottles. At the age of twenty, or earlier if exceptionally bright, he is entrusted with prescriptions. His knowledge of Latin is very moderate indeed, being self-taught, "but that is of no consequence at all: the directions on physicians' prescriptions are now written in English." As he gains experience he rises to be first clerk, at a salary of from 900 dolls. to 1000 dolls. a year, out of the house.

Rents in Milwaukie are not remarkable for their moderation. For a shop and basement, without any of the upper part of a house, in a good thoroughfare, 1000 dolls. a year is being paid in many instances by chemists; and in the very best situation, 2500 dolls. It must be remembered that the shops thus let are much larger, deeper and handsomer than ours, often fourteen feet high, and from fifty to eighty feet deep.

Prescriptions are never returned, but are pasted in a book where they are preserved as "guarantees in case anything is brought up at any future time." During the hot weather several chemists take 40 dolls. a day for sodawater drinks; of which 25 dolls. will be taken in the evening.

Chicago (*she-kaw'-go*), having a population of nearly 300,000, contains 158 dispensing chemists, 8 wholesale druggists, and 4 dealers in druggist's sundries.

No physician dispenses his own medicine, all prescribe, so that a chemist with a medium trade thinks it a bad day's business wherein he has not forty new prescriptions; often there are a hundred, besides repetitions. A few chemists return 60,000 dolls. per annum, and many more 30,000 dolls. *i.e.* £12,000 or £6000.

Rent for a small shop in a third-rate street, would begin at 500 dolls. a year; a better shop in a second-rate street, 1500 dolls.; and in the best situations from 3000 to 5000 dolls. a year are paid in several instances. A firm owning two retail shops in different parts of the city pays £950 for the two. For these rentals nothing is occupied but the shop and basement, and leases are either refused or granted for short terms. A competent assistant in Chicago receives 1200 dolls., or £240 a year, and keeps himself. The shop is kept open all

Sunday, and the hours during the week are very long, as in Milwaukie.

In Chicago there have not been till lately any means of instructing the young men. But within a few years there has been established a College of Pharmacy incorporated under the laws of the State. During the ensuing winter of 1870–71, lectures are to be delivered for the first time, by competent professors, on materia medica, chemistry and botany. A small collection of drugs and chemicals is in process of formation, and a monthly periodical is published to which the members contribute, and which may be seen in London, at the library of the Pharmaceutical Society, in Bloomsbury Square. The College will examine students and grant diplomas, having legal power from the State for that purpose, but the submission to its ordeal is voluntary.

In Iowa, which is one of the newly settled States, the druggists as they prefer to call themselves, cannot be expected to be so eclectic in their business as their brethren in the East, but they all dispense medicines and very rarely prescribe for popular ailments, endeavouring as far as possible to keep and maintain a public function and duty distinct from the physician.

In the State of Iowa a form of Maine liquor law prevails of exceptional severity. By this law no one may deal in spirits and intoxicating liquors except licensed druggists, and those only on obtaining an annual permit from the circuit state of Iowa, for which a charge has to be paid, and a bond of 1000 dolls. given to observe its enactments under further penalties. This licence entitles the druggist "to buy and sell intoxicating liquors for mechanical, medicinal, culinary and sacramental purposes only." Whether such an enactment really conduces to the advancement of pharmacy or the interests of its professors may be very much doubted; but here, as in all similar cases, public convenience asserts its superiority to public enactments, and the law is openly evaded. All over the state saloons or drinking bars exist in defiance of the statute, where intoxicating liquors are cautiously sold, where the known neighbours and general public are readily supplied. Shops in the new settlement appear to do what is called in England "a country trade;" besides dealing in drugs, chemicals, cattle medicines, and perfumery, they supply a great quantity of paints and colours, articles in much request owing to all the houses being built of wood which would perish unless painted once in two years. It is the custom for each druggist to supply slips of paper bearing his own name and address to the physicians in the district, who write their prescriptions on these

forms. Many specimens of such prescriptions are in the London society's collection. To this the public frequently object, choosing their own chemist. Prescriptions are not returned to the patient.

In the town of DAVENPORT, in Iowa, is a chemist's shop, like any other chemist's shop, and doing a similar business. It has only been opened four months. During that time the two proprietors have dispensed 2700 prescriptions. They are careful never to prescribe. Twenty years ago there was not one house where Davenport now stands with a population of 21,000 souls.

CINCINNATI, the capital of Ohio, has a population of 260,000, and a frontage on the river Ohio of more than three miles in extent. Here are 106 dispensing chemists, besides sixteen wholesale druggists and two drug mills, but there is no school in any part of the state for the instruction of young pharmacists, no professors and no lectures. Some years ago an attempt was made to establish a Pharmaceutical Society, but without leading to any practical result.

No apprentices are taken by any chemist either in Cincinnati or in Ohio, but a lad is selected to work in the business, and advanced according to his capabilities.

During the first year he is placed behind the sodawater counter, sent upon errands, made to dust bottles, cut labels and other humble duties, in fact. The second year he is allowed to appear behind the counter, where he serves simple articles and assists in the work both of the shop and laboratory. The third year he learns dispensing, either under the employer or the chief clerk. He receives no official instruction, but is allowed and urged to read certain books. He knows very little Latin indeed, and is not required to because "all directions are in English."

It is contended that this process is preferable to the English system of apprenticeship, as it gives the employer direct control over the employed; it enables him to dismiss those who show no aptitude for the business, thus relieving the trade of unprofitable drones; and it is in accordance with republican principles, enabling the humblest and poorest to rise by regular gradations to prosperity and independence. In one of the largest retail drug stores, the chief clerk, who is highly respected both by physicians and patients, entered the establishment a few years ago as a porter.

All prescriptions are retained by the chemist who first dispenses them, and preserved in a book. The subject has been well thought over and discussed in Cincinnati, and the custom is universally observed in the city, and throughout the State for this reason, "A

physician only intends his prescription to be used once by the patient; it is like a check which can only be cashed once, and is then retained by the banker."

No respectable chemist will ever prescribe in Cincinnati. They all refer patients to physicians, though in smaller shops this rule may not be so carefully observed. As a consequence a large number of prescriptions are written and dispensed. In one drug store the recipe then in the act of being compounded was numbered 267,457 and I was assured this number had been honourably and fairly worked up to since 1853. There is in no case any private understanding of a pecuniary nature existing between physicians and chemists, but many on either side steadily recommend their own friends.

In WASHINGTON, the seat of the United States government, there are not at present any educational advantages offered to young pharmacists. All prescriptions are retained by the chemist; who rarely prescribes himself, referring patients to a physician. No apprentices are taken here, as elsewhere.

Inquired of a gentleman who has been several years in the office of Inland Revenue in the United States Treasury at Washington, whether he believed the chemists and druggists throughout the Union, discharged their duties with reference to dealing in spirituous and intoxicating liquors to the satisfaction of the Government, or whether they abused the trust placed in them by making their drug stores dram shops? He replied that they gave entire satisfaction to the Government. In a few cases it was well known that undue advantage was taken, but in the large majority of instances it was not so. It was within his knowledge that as a rule, both the letter and spirit of the law were faithfully observed.

BALTIMORE, the capital of Maryland, has long and honourably been distinguished for its earnest and persevering zeal in the cause of pharmaceutical education. In the year 1841, the Baltimore pharmacists obtained an Act of Incorporation of the Maryland College of Pharmacy, "for the purpose of cultivating, improving, and making known a knowledge of pharmacy, and its collateral branches of science, and of giving instruction in the same by public lectures."

During the current year (January 26th, 1870), a further and very important progress has been made by obtaining from the Maryland General Assembly, a bill, entitled "an Act to prevent incompetent persons from conducting the business of a druggist or apothecary in the city of Baltimore." It is therein enacted that no person shall dispense medicines or compound prescriptions within the city until

he has passed an examination before certain pharmaceutical commissioners, and has received their diploma, under a penalty of 50 dollars fine for every week he so continues in business. It is confidently expected that in five years it will extend to the State, and in time to the Union.

Baltimore has a population of 400,000, whose physical ailments are ministered to by nineteen wholesale druggists and by one hundred and forty dispensing chemists.

The subject of returning or retaining prescriptions has been very sharply discussed in Baltimore. The physicians maintained that no prescription ought to be used a second time by the patient, without a second consultation and a second fee; that after being once compounded, the transaction was complete; much less ought the patient's friends to make use of it. The patient on the other hand stoutly affirmed the prescription was his own. With very few exceptions prescriptions are retained by the chemist who first dispenses them.

In Baltimore, apprentices are taken and recognised by the Acts. But the nature of the service differs considerably from our own. There is no premium received with the youth. The master pays for his services from the beginning, according to a published scale. There are no articles, written and binding in law, but there is a verbal engagement to serve for four years; and as the preliminary condition of receiving a diploma from the college is a service of four years under one employer, this arrangement is found to be sufficiently binding. At first the lad is required to do those duties usually performed by an errand boy in England, except that a coloured man assists in the hard work; and he is advanced by degrees, according to his aptitude, or dismissed according to his want of it.

A chemist of Baltimore, established for many years in one of the best situations, finding many of his customers migrating to a new and fashionable quarter of the city, resolved to open a branch shop there, on which he expended for marble fittings, fixtures, and stock, 10,000 dolls., *i.e.* £2000, before he opened the door.

New York and Boston, Baltimore and Philadelphia, have vied with each other for many years in the noble cause of pharmaceutical progress; and each city can boast of special services and honourable distinction. To Philadelphia must be conceded the honour of having led the van, and of inaugurating a system of pharmaceutical instruction and elevation worthy of most cordial approbation. Philadelphia alone, of American cities, is able to own and maintain a separate building adapted expressly and employed exclusively for the purposes

of pharmaceutical education. In the other cities rooms are hired or borrowed from scientific institutions; but in the Philadelphia College of Pharmacy are to be found spacious lecture halls, committee rooms, a library, and a museum in process of formation. Besides these, a laboratory is being constructed, with hopes that it will be in full working order during the ensuing winter of 1870–71.

Courses of lectures are delivered here three evenings in every week, during the winter months; those on practical pharmacy by Professor Parrish, who enjoys a European reputation, and whose name is held in high honour by every British pharmacist; on materia medica and on botany by Professor Maisch; and on chemistry by Professor Bridges.

In these cities, prescribing across the counter is studiously discouraged. If a patient desires a remedy for an ordinary malady as for temporary indigestion, a chill, a headache, or for diarrhœa, the chemist refuses to supply it.

Exceptions to this rule are, however, made whenever the malady complained of is met by any of the proprietary medicines prepared by the chemist. But in all other cases so carefully is it observed, that lately on a patient presenting himself with a speck of dust in his eye, causing acute suffering, he was referred to an oculist, who charged five dollars for the operation and wrote a prescription for a lotion.

The consequence of this practice is, that very many chemists (and there are 326 in Philadelphia alone), dispense thirty prescriptions in a day, others fifty, a few one hundred, and the more eminent houses about one hundred and fifty, including repetitions. The physician's fee in the Eastern cities is generally five dollars for the first visit, and two dollars for every succeeding one.

Prescriptions are retained by the chemist.

ELEGANT PHARMACY.

There has been developed with great success in the Eastern cities, a class of business almost unknown in England, called "Elegant Pharmacy." By this is understood the art of preparing drugs for the use of physicians in such a manner that they shall be more readily assimilated by the digestive functions of the patient, or be less disagreeable in taste, or more convenient in form.

If, for example, sulphate of quinine could be so skilfully exhibited as not to affect the head, or if by combination with certain aromatics it could be made relatively tasteless, such preparations

(being of a definite and exact strength, say in the form of solution containing one grain to the fluid drachm) would be illustrations of "Elegant Pharmacy." Professor Parrish's chemical food is an illustration of convenience of form.

Very important progress in this useful art has been made by American pharmacists, with the happiest results to the physician, the chemist, and the patient.

A great advantage is enjoyed by the American chemist, from the circumstance that the members of the medical profession, so far from viewing those secret preparations with distrust, regard them with the keenest interest, and give the skilful pharmacist their warmest encouragement; so that on a pharmacist having succeeded in preparing a new combination fulfilling any of the required conditions, he has only to submit it to the profession with an explanation of its merits, when they at once order it in their prescriptions, with a confidence that is equally honourable to both parties. For this reason, many American prescriptions order special preparations in this manner:—

"℞ Sol. Strychniæ Aromat. (Smith & Smith) ℥i."

Successful combinations acquire great reputation and large demands, not only in the chemist's own city, but throughout the whole Union.

In the rooms of the Pharmaceutical Society at Bloomsbury Square are deposited a few specimens illustrating this art, for the inspection of pharmacists.

Note.—If John Smith starts a pharmacy, it bears his name; if his family grow up and share, it is called John Smith & Sons; but if he dies and the business is still carried on, it becomes John Smith's Sons.—*End of Original Notes.*

AMERICAN RECIPES.

Castor Oil and Glycerine Pomatum. (American.)

℞ Ceræ Albæ	℥iss.
Glycerin.	℥ij.
Ol. Ricin.	℥xij.
Ess. Limon.	℥v.
Ess. Bergam.	℥ij.
Ol. Lavand.	℥j.
Ol. Caryoph.	gtt. x.
Annatto	gr. x.
Spirit Rect., Aquæ Dest.	ää q. s.

By a moderate heat dissolve the wax in a small portion of the castor oil (one-fourth), and triturate it with the remainder of the oil and the glycerine till quite cool; then add volatile oils. Lastly, rub the annatto with a drachm of water till smoothly suspended; add a drachm of alcohol, and stir the colouring into the pomade until it is thoroughly mixed. Avoid much heat.

Cold Cream. (J. B. Moore.) This pharmacist objects to rose water as an ingredient: he proposes—

℞	Ol. Amygd. Dulc.	℥xss.
	Cetacei	℥iij. ℥vj.
	Ceræ Albæ	℥x.
	Ol. Rosæ	gtt. x. M. S. A.

It may be mentioned that the secret of making this and similar preparations, is to use a porcelain basin many times larger than the bulk of the ingredients, and stir well with a stout wooden ladle. The same applies to the *dispensing* of cerates and ointments ordered by prescription. One or two ounces of such formulæ are made to advantage in a dish capable of holding the same number of pounds by weight. These last should be passed through a piece of fine muslin. It is a great advantage to add a certain amount of aqua rosæ to cold cream when properly manufactured.

Glycerine Lotion. (J. B. Moore.)

℞	Glycerine	℥iij.
	Mucil. Sem. Cydon.	℥x.
	Pulv. Cochineal.	gr. v.
	Aq. Bullient.	℥iss.
	Sp. Vini	℥iiss.
	Ol. Rosæ	gtt. viij.
	Pulv. Acaciæ	℥ss.
	Aquæ	℥viij.

Rub the cochineal in the hot water, and add the spirit. Triturate the rose oil with the gum arabic, and gradually add the water. Mix both solutions and filter; add the mucilage and glycerine. Shake all together. An elegant lotion for the hands and face.

Hufeland's Powder.

℞	Magnes. Calcin.	℥iss.
	Rhei Pulv.	℥iij.
	Sacchar. Pulv.	℥ss
	Ol. Fœnic. Dulc	gtt. xlviij.

Medicamina Dividata.—Divided Medicines. Introduced and patented (September 16th, 1870,) by Fred. Kraus of Cincinnati.

This is an elegant and ingenious plan for giving medicines in a portable and convenient form. A sheet of gelatinized paper, marked in twelve divisions each containing one dose, is contained in a neat envelope.

This method, which it must not be forgotten is a patent, may be explained by the mode in which quinine is given. Quinine is finely rubbed down with glycerine; gelatine is added, and the whole is poured on to a slab or plate divided by ridges into chess-board squares. Evaporate to dryness by a gentle heat. 50 grains in 100 squares are equal to half a grain in each.

Thus quinæ sulphas—every square of the paper contains $\frac{1}{2}$ a grain; benzoic acid—every square contains $\frac{1}{2}$ a grain; while with strychnia—every little square contains $\frac{1}{50}$ grain, and so with the whole catalogue of remedies, capable of being thus exhibited in various doses.

Z. D. Gilman of Washington, dries and powders his blue pill mass. Sugar-coated pills are used on such an extensive scale as to alter the duties of the dispenser; he is not a *pill-roller* in America. With gelatine-coated pills we are already familiar; they are prepared at New Lebanon most extensively. To economise time and trouble seems the direction towards which American energy tends.

Syrup of Wild Cherry (Compound). Prescribed by the late Dr. P. B. Goddard, and much used.

℞	Morphiæ Sulphat.	gr. ij.
	Antimon. Oxysulphuret (Kermes, U. S. P.) . .	gr. iv.
	Syrup of Wild Cherry Bark	℥iv.

Rub the powders in a mortar with a little of the syrup until perfectly smooth, and then add the remainder and mix them. A small quantity of cyanide of potassium to increase sedative power was occasionally added, this may be omitted. Dose—a teaspoonful three or four times a day.

Syrup of Wild Cherry Bark.

℞	Wild Cherry Bark	5 troy ounces.
	Sugar (refined) in coarse powder . .	28 troy ounces.
	Water a sufficient quantity.	

Moisten the bark thoroughly with water, and allow it to stand for twenty-four hours in a close vessel; then pack it firmly in a glass percolator, and gradually pour water upon it until a pint of filtered liquor is obtained. To this, transferred to a bottle, add the sugar, and agitate occasionally until it is dissolved. (U. S. P.)

Tinctura Iodinii Decolorata.—Colourless Solution of Iodine. This preparation has frequently engaged the attention of pharmacists. The object contemplated being to utilise the solvent properties of iodine without the objectionable stain produced by its external application. The medical value of this preparation has yet to be more clearly ascertained, an unfavourable opinion being at present entertained. It is obvious that to present an efficacious solution of iodine, deprived of colour, would result in a commercial gain to the pharmacist. Many experiments have been tried in London hitherto without success.

Dr. C. O. Curtman, of Missouri, records many experiments which are interesting, but by no means novel.

	1	2	3	4	5	6	7	8	9
Iodine grains	38	38	38	38	38	38	38	38	38
Alcohol flu. drachms	8	7½	7	6½	6	5½	5	4½	4
Aq. Ammon. Fort.	℥j.	℥ss.	℥j.	℥iss.	℥ij.	℥iiss.	℥iij.	℥iiiss.	℥iv.

Dissolve the iodine in alcohol, add ammonia, the dark precipitate formed being re-dissolved in a few hours. No. 1 was the standard solution for comparison. Every vial speedily showed some slight discolouration. No. 9, on the third day retained only a deep straw colour; in five days it was completely decolourised; hence this formula :—

Iodine	℥x.
Sp. Rect.	℥xiij.
Aq. Ammon. Fort.	℥iij.

If the presence of iodide of potassium be not objectionable, then the ammonia may be reduced in quantity. Four vials were thus filled.

	1	2	3	4
Iodine . . . . . grains	15	15	15	15
Iodide Potassium . . grains	30	30	30	30
Alcohol	℥viiss.	℥vij.	℥viss.	℥vj.
Aq. Ammon. Fort.	℥ss.	℥j.	℥iss.	℥ij.

For complete decolouration No. 4 required six days, and the others in proportion. Speedy decolouration may be attained by adding excess of ammonia, and the addition of hydrocholoric acid until the reaction is feebly alkaline. Chloride of ammonium is precipitated, while iodide of ammonium and iodate of ammonia remain in solution. Other expedients have been suggested, but the therapeutic efficacy of the solution has been doubted.

Tinctura Opii.—Tinctura Opii Deodorata. Dr. Squibb (Report). It appears to be very desirable that these and all preparations of opium should have a definite prescribed morphia-strength: that is,

should be made by assay, or at least from assayed opium, and the strength be adjusted by dilution.

Early in 1860 your reporter made an assayed solution of opium; —or rather made it some time before, but published the formula and his experience with it at that time. This was called liquor opii compositus, and a detailed account of it may be found in the *Amer. Journ. Pharm.* 1860, pp. 115 et seq. This was proposed to the Committee of Revision, but was rejected in favour of the present officinal tinct. opii deodorata. As soon as the formula of the latter was authoritatively published, your reporter made it, and offered it for sale, together with the assayed preparation, giving briefly the prominent points of both, but claiming that the Committee of Revision preferred the present officinal. This latter was also offered with a considerable discrimination in price in its favour, and physicians were asked to use it with, or substitute it for, the other. Besides this, it was always made from assayed opium, and was of uniform strength. This course has now been fairly pursued by your reporter for about ten years, with occasional reports from good authorities upon the comparative merits of the two preparations, the strength and uniformity being the same. These reports have been without exception in favour of the compound solution, and its use has increased steadily and much more rapidly than that of the deodorized tincture, and this without advertising of any kind, except the no small advantage of officinal authority and preference.

Under these circumstances, your reporter would recommend a change in the composition of the compound solution by replacing the compound spirit of ether which it contains, by either chloroform, or acetic ether, or both, and its adoption in the next Pharmacopœia. There is now no doubt, in your reporter's judgment, as to the utility and efficacy of the process used for depurating the opium, nor of the assaying. Nor is there any doubt of the therapeutic advantage of the compound spirit of ether. But the odour of ether is very disagreeable and even nauseating to a small proportion of patients, and recent experience has shown that the modifying influence of chloroform upon opiates is very favourable and very useful. It has occasionally happened that, where the comp. solution of opium has been long kept with free access of air, particularly when kept in warm places or in warm climates, that the odour of ether and of oil of wine have disappeared and been replaced by quite as strong an odour of acetic ether. The preparation thus changed has in a few instances been well tried therapeutically, and, so far as these few trials go, has been considered to be unimpaired, whilst it has been

more acceptable to the stomach. Successful and skilful French physicians have long habitually used acetic ether as a nervous stimulant and diaphoretic, and as an agreeable and useful corrigent very acceptable to the stomach. The chloroform and acetic ether, if used together, would make a very elegant preparation, and would protect the solution from change quite as well as the compound spirit of ether.

Whether this or any similiar preparation be adopted in the next revision is, however, a matter of much less consequence than the making of all opium preparations by assay. And your reporter cannot too strongly urge this point in connection with the Pharmacopœia. (United States.)

Tinct. Rhei Dulcis.

℞	Pulv. Rhei	℥viij.
	Rad. Liquirit., Sem. Anisi.	āā ℥iij.
	Cort. Aurant.	℥j.
	Sem. Cardam.	℥iv.

Mix. Moisten with half a pint diluted alcohol, pack in a percolator, and pass diluted alcohol until a gallon has been obtained.

Tyson's Antimonial Powders.

I.

℞	Antimonii Oxyd.	gr. ij.
	Calcis Phosphat.	gr. xviij.
		Mft. pulv.

II.

℞	Antimonii Oxyd.	gr. ij.
	Potassæ Sulphat., Calcis Phosphat	āā gr. ix.
		Mft. pulv.

Sweet Quinine.—This substance which was introduced to the American public by Mr. Frederick Stearns, has been examined by Mr. Procter of Philadelphia. From the advertising circular it was inferred to be the alkaloid quinia, associated with liquorice sugar. It was imagined that by manufacturing skill, free quinine was combined with glycyrrhizin in lieu of sulphuric acid. On investigation the remedy appears mainly to consist of the alkaloid cinchonia, precipitated from the sulphate, dried, and triturated with an impure glycyrrhizin prepared from liquorice root. Cinchonia is very insoluble, requiring nearly 4000 parts of cold water, hence the tastelessness of *sweet quinine*, and its bitterness with acid or alcoholic fluids which salify and dissolve it. These conclusions are supported by numerous experiments.

Explanation by Mr. Stearns (*Proc. of the American Pharm. Assoc., Chicago*) :—

"Mr. President and gentlemen: Dr. Squibb has seen fit to introduce a resolution for my expulsion. Of course, when such a serious charge is made, I feel it to be a duty to myself, as well as to the society, to explain exactly upon what ground I stand. It is true I put into the market a specialty under the trade name of 'sweet quinine,' which is made of cinchonine. In doing this I have had a double motive. Of course, the first motive was pecuniary gain—selfishness; the second motive was this: in looking at the history of the cinchona alkaloids, I find that there are quinine, quinidia, and cinchonine. Cinchonine has less oxygen in it than quinine has, but therapeutically they are identical. The discoverers of quinine, which was secondary to that of cinchonine, were, with their associates, business men, and they put quinine into the market as a business enterprise, to reap the fruits of their discovery as much as for any other reason. Quinine has become the fashion: it is no better than cinchonine or quinidia, but it has become the fashion. I purchased as a trade-mark the words 'sweet quinine,' with a view of making it available as a business enterprise. The intent was to use it as a benefit in making money, and to bring into use this alkaloid, cinchonia, which had hitherto been neglected. I felt justified, in looking the ground over, in adopting as much of the reputation of quinine as I possibly could to make it a saleable commodity, and in that fact lies my sin against the ethics of the association, and against the ethics of pharmacy. I looked the matter over reflectively, and I thought I was justified in doing as I did. Had I known that my action would produce the feeling it has done, I am free to avow now that I should not have brought myself into collision with the better members of the profession of pharmacy in the country, many of whom I have known. Those are the facts, and upon that ground I stand. What I have done, I have done; I don't hide it; I don't propose to shrink from it; and you have it as I got it. Now, as far as the justice of these resolutions brought up here is concerned and the penalty sought to be imposed upon me for this violation of the ethics of the association, I look upon it as a very severe measure. I don't think myself that the offence calls for any such penalty. Each of us, of course, must judge for himself in such matters. Whatever the society is disposed to do I must bow to, but the effect of such action upon me will be serious; that, it is needless to conceal. If I have lost the respect of the members of the association, that alone is a very serious thing for me. The business point of view is secondary, and of course no interest whatever to the association. My sense of justice, if this action is carried out, I am free to confess, is outraged. I cannot feel that I deserve any such extreme action as

this. Each of us, of course, has his standard; each one has the standard of morality his life gives him. I don't feel that I have sinned to that extent which requires any such action as that. That I differ materially from the prominent members of the association, I have now ascertained. Justice, in the treatment of legal questions, is oftener the exponent of public revenge than of the Christian idea of correcting an evil, and it strikes me the true idea in this matter is, if the sense of the society is against me, to pass such action as will tend to correct the evil, or error, and not drive me out of the society. I make no pledges for the future whatever; what I have done I must be judged by, but I strongly protest against any such thing as this expulsion; I think the members can so frame their action as to suit a milder and more charitable view. However, the association can do as it pleases, and I must abide by its action."

CONFERENCE BANQUETS.

American Pharmaceutical Association, Chicago, 1870. Moved:

"*Whereas*, The custom of giving expensive entertainments to visiting members by those residing at the place of meeting is at once onerous to the latter and detrimental to the interests of this Association; therefore

Resolved, That the local secretary be instructed that the members of this Association neither expect nor desire any special entertainment at the hands of the Baltimore members during our meeting there in 1870.

Mr. Bringhurst.—I think this will relieve the members from any effort or expense. Of course, if they choose to invite the Association to visit different places, that is one thing; but I think it will relieve the members of any especial effort or great expense, and will tend to break up this bad custom which we all feel is growing on us.

Mr. Colcord.—I think the resolution is carefully worded; the Association does not "expect nor desire." I think that that expresses what we mean. We cannot vote not to receive their courtesies, but if we say that we do not expect nor desire them, it is sufficient.

Mr. Bringhurst.—I tried to word it to convey the meaning that we did not desire nor expect any special entertainment."

[This resolution fully expresses the sentiments of the fraternity in England. Unless this course be adopted in the infancy of the conference, that institution runs a perilous chance of never reaching manhood.]

SECTION II.

ENGLISH AND CONTINENTAL PHARMACY.

Amygdaline Powder for preparing the *looch blanc* of the Codex. (*Union Méd.*) M. Ch. Ménière furnishes the following: Take of sweet and bitter almonds the quantities indicated by the Codex. Make an emulsion, to which add 300 grammes of powdered sugar, and concentrate at a gentle heat; pour the paste into thin cakes, which must be dried in a stove, then reduce to powder; lastly add 5 grammes of gum tragacanth, and preserve.

To prepare a *looch* take

Almond Sugar	32,50

Triturate; and then add

Orange Flower Water.	10,00
Common Water.	120,00

At the end of a few minutes a *looch* will be obtained, which, according to M. Ménière, leaves nothing to be desired.

Antiblennorhagic Injection. (*Union Méd.*) Dr. Rollet gives this formula:—

℞	Extract of Rhatany.	2 grammes.
	Zinc Sulphate	20 centigrammes.
	Distilled Water	200 grammes.

Make a solution for injection, three or four times a day. Give at the same time the opiate of balsam of copaiba and cubebs.

Aqua Chlorinii Extemp. (American.)

℞	Potas. Chlorat.	℈ij.
	Acid Muriat.	ʒiv.

When the bottle is nearly filled with chlorine vapours, add aquæ dest. ʒj. Stopper the bottle, and when the crystals have dissolved, add distilled water up to one pint.

A similar preparation is prescribed by Mr. Beaman, of London, as a remedy for hay-fever. It is unstable.

Atropa Belladonna. Dr. D. W. Horment, in the *Medical Record*, New York, states that a solution of two drachms extract of belladonna in a fluid ounce of water, applied over the breast with a brush,

will stop the secretion of milk, and that its application to one breast will suspend its secretory action without affecting the other. It need not be stated that the application of belladonna for this purpose is resorted to with most beneficial result in English hospital and private practice.

Baldness, Preparation to cure. (*Union Méd.*) The following formula is given:—

Rum	500	grammes.
Alcohol	75	,,
Distilled Water	75	,,
Tincture of Cantharides	3	,,
Carbonate of Potash	3	,,
Carbonate of Ammonia	5	,,

Mix the liquids, after having dissolved the salts, and filter. After the skin of the head has been wetted with this preparation for several minutes, it should be washed with water.—*Journal de Pharmacie.*

Calomel, Varieties of. There has been much discussion as to which kind of calomel is the most active as a medicine. The sublimed calomel (of a yellowish white colour) is undoubtedly the mildest in its action; precipitated (snow-white) calomel is the most powerful. Between the two in this respect there lies (also of a pure white colour) *calomel à la vapeur*. Microscopical examination shows that the sublimed calomel is the least finely divided, and the precipitated the most so. It is by no means the same thing whether the one or the other be dispensed as a medicine, each of the three varieties should be regarded as different medicines.—*Hager's Centralhalle.*

Canquoin's Paste.

Chloride Zinc	8
Oxide Zinc	1
Flour (dried at 100° C.)	7
Cold Water	1

Mix the oxide of zinc and the flour; dissolve the chloride of zinc in the water, and, having added the flour and oxide, rub in a mortar for ten minutes. The paste so prepared in a few hours acquires the requisite consistence, which it henceforth always retains. It may be preserved in a box, covered with a layer of starch, but a stoppered bottle is preferable.—*Gazette Médicale.*

Carbolic Glycerine.

℞	Carbolic Acid	1
	Glycerine	4

Carbolic Plaster.

℞ Carbolic Glycerine 34
Prepared Chalk 94

Mix by kneading.

Chlorodyne. Printed formulæ.

Dr. Ogden's (Royle).

℞ Æther. Chlor. . . . . ℥j.
Chloroform . . . . . ℥vj.
Tinc. Capsici . . . . . ℥ss.
Ol. Menth. Pip. . . . . gtt. ij.
Morph. Mur. . . . . gr. viij.
Acid. Perchlor . . . . . gtt. xx.
Tinc. Cannab. Ind . . . . . ℥j.
Theriacæ . . . . . ℥j.
Acid. Hydrocy. Scheele . . . . . ♏ xij.

Squire's (Companion).

℞ Chloroform . . . . . ℥iv.
Æther . . . . . ℥j.
Sp. V. Rect. . . . . ℥iv.
Theriacæ . . . . . ℥iv.
Ext. Glycyrrh. . . . . ℥iiss.
Morph. Mur. . . . . gr. viij.
Ol. Menth. Pip. . . . . ♏ xvj.
Syrupi . . . . . ℥xviiss.
Acid. Hydrocy. dil. . . . . ℥ij.

Edward Smith.

℞ Chloroformi . . . . . f. ℥iv.
Morphiæ Mur. . . . . gr. xx.
Æther. Rectif. . . . . f. ℥ij.
Ol. M. Pip. . . . . ♏ viij.
Acid. Hydrocy. Dil. . . . . f. ℥iv.
Tinct. Capsici . . . . . f. ℥vj.
Mist. Acaciæ . . . . . f. ℥j.
Theriacæ . . . . . ad f. ℥iv.
Misce.

F. Stockman.

℞ Chloroformi . . . . . ℥iv.
Sp. Vin. Rect. . . . . ℥ij.
Morph. Hydrochlor. . . . . gr. viij.
Acidi Perchlor. . . . . gtt. x.
Tinct. Capsici . . . . . ℥ss.
Tinct. Cannabis Ind. . . . . ℥i.
Acid. Hydrocyan. (Scheele's) . . . . . gtt. xij.
Theriacæ . . . . . ℥i.

T. S. Dowse.

℞ Belladonnæ Extracti . . . . . ℥ij.
Morphiæ Muriatis . . . . . gr. xxx.
Ætheris Rectificat. . . . . f ℥viij.
Chloroformi . . . . . f ℥viij.
Acid. Hydrocyanic. dil. . . . . f ℥iv.
Olei Menthæ Piperitæ . . . . . gtt. xxx.
Capsicine . . . . . gr. vj.
Misturæ Acaciæ . . . . . ℥xx.
Caramel . . . . . ℥j.
Theriacæ . . . . . ad ℥lx.
M. s. artem.

Collodion Cantharidal. (W. S. Thompson.)

Cantharides in fine powder . . . . . ℥j.
Collodion Cotton . . . . . .
Stronger Alcohol . . . . . .
Stronger Ether . . . . . āā q.s.

Moisten the cantharides with four fluid-drachms of stronger alcohol, and pack it in a glass percolator of proper size, arranged for displacement, with the lower end closed with a cork. Pour on the contents of the displacer four fluid-drachms of stronger ether, and cover it with an accurately-fitting plate of glass. At the expiration of twelve hours, displace with a mixture of stronger ether and stronger alcohol, in equal measures, until two fluid-ounces are obtained, which set aside in a three-ounce vial. Continue the displacements until one fluid-ounce more has passed through. Allow this to evaporate spontaneously, and dissolve it in the first two fluid-ounces of percolate obtained, to which add six grains of collodion cotton, or a sufficient quantity to make the cantharidal collodion of the proper consistence. Agitate the mixture occasionally, until the cotton is dissolved.

Collodion. (A New Styptic.) (Carlo Parvesi).

Collodion 100
Carbolic Acid 10
Pure Tannin 5
Benzoic Acid 5

Agitate till the mixture is complete. This preparation which has a brown colour, leaves on evaporation a pellicle exactly similar to that of an ordinary collodion. It adheres strongly to the tissues, and effects the instantaneous coagulation of the blood and albumen.

Tannin effects a consistent coagulation of the blood, whilst benzoic acid has a cicatrising action on the tissues.

Collodion, the Manufacture of.

This formula is given by Mr. G. Wharton Simpson, in his "Year Book of Photography":—

To make the pyroxyline. Take of —

Nitric Acid . . .	sp. gr. 1420	3 measured ounces.
Sulphuric Acid. .	sp. gr. 1840	3 ,, ,,
Best carded Cotton Wool . . .		2 drachms.

The cotton wool should be pulled into light, flat tufts, and spread ready for immersion. The acids should be mixed in a jar, which should stand in a deep dish containing very hot water. When the temperature of the acids is 150° Fah., which must be ascertained by means of a thermometer kept for the purpose, the cotton must be immersed, a tuft at a time, as rapidly as possible, each piece being pressed into the liquid by means of a stout glass rod or spatula. At the expiration of ten minutes lift the mass of cotton up with two glass rods, pressing away as much of the acid as possible, and plunge it into a bucket of water, which should be provided beforehand. Quickly stir and separate the cotton through the water, and, after washing a few minutes, change the water, and so repeatedly for a few hours; then wring out the water, and separate the mass into light tufts for drying. It may be spread out in a warm place, or dried over a water bath. The cotton will have gained from 30 to 50 per cent. in weight, and will dissolve at the rate of 5 or 6 grains to the ounce in a mixture of equal parts of ether and alcohol, with very little residue. In some cases unsized paper is used instead of cotton.

The following formula gives excellent results:—

Ether	sp. gr. 725	1 ounce.
Alcohol	sp. gr. 805	1 ounce.
Ditto	sp. gr. 820	1 ounce.
Pyroxyline		15 to 18 grains.
Iodide of potassium, sodium, or ammonium		6 or 7 ,,
,, cadmium		6 or 8 ,,
Bromide of ditto		1 to 3 ,,

This should be mixed a few weeks before use. With the larger proportion of bromide it will keep upwards of twelve months. For dry plates the bromide may be doubled.

Collyrium. (Tavignot's Belladonna.)

Aq. Destill.	125
Ext. Belladonnæ	8

To obtain dilatation of the pupil in central opacity of the cornea, drop two or three drops into the eye every other day.

Colours for Show Bottles. (Canada.)

RED.

I. Liquid magenta dye, q. s.

This is a good colour, stands well, and can be easily deepened by the addition of a little more magenta.

II. Iodine, 1 part; potass. iodid., 1 part. Dissolve in a little alcohol, and use as required.

III. Dissolve cochineal in liq. ammonia, by the aid of a gentle heat. This produces a fine colour, but liable to fade.

PURPLE.

Plumbi acetas, 24 parts; cochineal, 1 part.

PINK.

Cobalt. nitras: ammon. carb. (in excess). This is a very pretty colour.

YELLOW.

I. Potas. bichrom., 6 parts; potas. carb., 4 parts.

II. Potas. chromas, q. s. Both these are good and permanent colours.

CANARY.

Picric acid dissolved in a little alcohol.

ORANGE.

Potas. bichrom., q. s. Acid. sulph. deepens the colour.

GREEN.

Dissolve a few copper coins in nitric acid. Very permanent.

EMERALD GREEN.

Nickel, dissolved in dilute sulphuric acid by heat. A very beautiful and permanent colour.

BLUE.

Cupri sulph. 2 parts; acid. sulph., 1 part.

ROYAL BLUE.

Cupri sulph. Dissolve, and add liq. ammon. to the required shade.

Dispensing Medicines.—Suggested Price List. (J. C. Pooley.) Ordinary mixtures by prescription (including bottles), containing not more than one drachm of spirit or tincture to each ounce, and only small quantities of expensive ingredients.

	s.	d.
2 oz. mixture	1	0
3 ,, ,,	1	3
4 ,, ,,	1	4
6 ,, ,,	1	6
8 ,, ,,	1	8
10 ,, ,,	2	0
12 ,, ,,	2	4
16 ,, ,,	3	0
20 ,, ,,	3	6
24 ,, ,,	4	0
32 ,, ,,	5	0

I.e. for 2 oz. at the rate of 6*d.* per oz.
,, 3 ,, ,, 5*d.* ,,
,, 4 ,, ,, 4*d.* ,,
,, 6 ,, ,, 3*d.* ,,
,, 8 ,, ,, 2½*d.* ,,
above 8 ,, 2*d.* for each *additional* ounce.
above 16 ,, 1½*d.* for each *additional* ounce.

A minimum charge of sixpence for one or more ordinary pills by prescription, up to six, and threepence for every additional six pills or fraction thereof thus:—

	s.	d.
1 to 6 pills	0	6
7 to 12 ,,	0	9
13 to 18 ,,	1	0
19 to 24 ,,	1	3
above 24, charge per doz.	0	6

For draughts I would suggest:—

	s.	d.
1 draught	1	0
2 draughts	1	9
3 ,,	2	6
4 ,,	3	0
6 ,,	4	0

I.e. for 2 draughts, at the rate of 10½*d.*
,, 3 ,, ,, ,, 10*d.*
,, 4 ,, ,, ,, 9*d.*
,, 6 ,, ,, ,, 8*d.*

For 1 or 2 pills and a draught from the same prescription, 1*s.* 3*d.*

Drops composed chiefly of tinctures, etc., should be charged at the rate of sixpence per ounce, and sixpence for dispensing, etc., *i.e.*:—

	s.	d.
1 oz. of such drops	1	0
1½ ,, ,,	1	3
2 ,, ,,	1	6
3 ,, ,,	2	0
4 ,, ,,	2	6

Stoppered bottles extra.

For cheaper material, such as liq. potassæ, or liq. arsenicalis, for 1 oz. 1*s.*, and 4*d.* per oz. for each additional ounce.

Powders, a minimum charge of sixpence; above three, at the rate of twopence each; above six, a penny for *each additional* powder; thus:—

	s.	*d.*
3 powders (and under)	0	6
4 „	0	8
6 „	1	0
12 „	1	6
18 „	2	0
24 „	2	6

For lotions, gargles, and decoctions a minimum charge of one shilling for four ounces, and three-halfpence for each additional ounce; *i.e.*:—

	s.	*d.*
4 oz. lotion	1	0
6 „ „	1	3
8 „ „	1	6
10 „ „	1	9
12 „ „	2	0
16 „ „	2	6
20 „ „	3	0

If containing spirit in excess of one drachm per ounce, an extra charge to be made.

For ointments (in covered pots) sixpence per ounce, and sixpence for dispensing, etc., *i.e.*:—

	s.	*d.*
½ oz. ointment (and under)	0	9
1 „ „	2	0
1½ „ „	1	3
2 „ „	1	6

Dispensing Note I.—Explosive Mixtures ordered in Prescriptions.

℞ Potassæ Chlorat.	℥iss.
Acid. Tannic.	℥iss.
Ol. Gaultheriæ	gtt. xx.
	Mft. pulv. i.

Sig. Put in a quart of water.

This was mixed in a new Wedgwood mortar, having therefore a rough surface, and blew up, inflicting injury on the dispenser. In all similar cases, powder or dissolve, as the case may be, the ingredients separately, and mix.

Dr. Jackson writes:—"May I tell you a curious fact with regard

to the explosive nature of oxide of silver? The following prescription I gave to a lady last Monday:—

℞ Argenti Oxidi . . . . . gr. xlviij.
Morph. Muriat. . . . . gr. j.
Ext. Gentian. . . . . q. s. M.
Make twenty-four small pills, and silver them, etc.

"These pills were put into a ordinary pill-box. The lady, being in her nursery, and having no pocket in her dress, placed the box in her bosom (I suspect next the skin). In three-quarters of an hour a severe explosion took place; her under-clothes over the part were reduced to *tinder*, and her right breast severely scorched, and smoke issued freely from beneath her dress. She seized the parts with both hands, and thus put out the fire; but since then I have had to dress a rather severe burn on the bosom."

℞ Potass. Chlorat. . . . . ℥ss.
Sodæ Hypophosphit. . . . . ℥j.
Syrup. Simpl. . . . . ℥ss.
Aquæ ad. . . . . ℥vj. M.

The salts, owing to pressure with regard to time, were mixed energetically together in a mortar. Explosion ensued, with no other dangerous result than whirling the pestle to a distance, and slightly injuring the dispenser.

Dispensing Note II.—Incompatibility of Sulphate of Quinine and Digitalis. (*Journ. de Pharm. et de Chim.*, xi., 55.) M. Stan. Martin informs us that a doctor having prescribed syrup of digitalis prepared according to the Codex, added to it *acid* sulphate of quinine. The mixture, which he imagined ought to be clear and limpid, contained a precipitate, and he, thinking there was some error, applied to M. Stan. Martin to know the cause. The researches of M. Martin showed him that a chemical reaction had taken place in the mixture, and the tannin contained in the digitalis had combined with the quinine to form an insoluble tannate. From these and similar facts M. Stan. Martin arrives at the conclusion that the vegetable salts will be the more active if used alone or dissolved in water. A practitioner who prescribes a compound draught very often does not know to which substance he may attribute the action.

Dragées and Granules, Medicinal. (Ernest Agnew.) The method adopted in their manufacture is one of admirable simplicity, but succeeds best on a large scale, unfortunately preventing its use

for the general work of a dispensing counter. But the numerous special pills constituting the "patent" or leading article of nearly every pharmacist, can be made quicker, better, and more advantageously than by the ordinary method, even where aided by machinery. The ingredients for the pills should be thoroughly mixed and sifted, so as to form a fine impalpable powder. With some substances of an untenacious character it is necessary to add a little dextrine, sugar, or gum. The sugar granules forming the nuclei of the pills are either to be bought from the wholesale confectioners, under the name of *nonpareils*, or are easily made by agitating and rubbing together coarsely sifted sugar and syrup in a large copper basin over a slow charcoal fire.

The granules, weighing each about one-tenth of a grain, are measured out so as to furnish the requisite number of pills, and are introduced into a large copper basin suspended by two ropes from a bar of wood, capable of revolving horizontally on an iron bolt fixed in the ceiling. A small charcoal fire is lit in an open pan under the basin, and serves also to keep warm a quantity of syrup, with which the granules are moistened from time to time, and continually rubbed and agitated with a little of the powder, added very gradually, the basin being rapidly rotated, and jerked upwards occasionally. This operation, which must be repeated an indefinite number of times until the *dragées* are completed, requires considerable skill on the part of the manipulator, for if too much of the excipient be added at once, it dissolves the previous *couche*, and prevents the regular formation of the concentric layers of which each *dragée* is built up, much in the same manner as starch granules are by some supposed to be formed. The final coating with sugar is the least difficult part of the operation, and is done either with syrup alone, or with the addition of a little plaster of Paris, very brisk agitation being required so as to avoid any agglomeration of the *dragées*, the temperature being so regulated as to dry the sugar without a possibility of melting it. Or, in the case of certain pills, where sugar-coating is undesirable, owing to its discolouration by the ingredients of the kernel, such as in pills of iodide of iron, etc., copal and balsam of tolu dissolved in ether forms an excellent coating, easy of application and effective in results.

Eggs, Preservation of.

℞	Quicklime, Salt, āā	1 lb.
	Saltpetre	3 ozs.
	Water	1 gallon.

Boil the solution ten or fifteen minutes, and when cold put in the eggs, small end downwards, using a vessel lined with lead, and placing in a cold but dry cellar.

Ergot. By Charles Ronayne, L.R.C.P., etc. (*The Medical Press and Circular*, vol. ix., p. 267.)

The author objects to the Pharmacopœia preparations of this drug, on account of their well known inertness and uncertainty; and with reference to Mr. Long's preparation he says, "I have carefully experimented with glycerine, and I find it does not dissolve the organic salts, it does not *extract* the oleaginous elements, and will only mix with the amylacious when mechanically made to do so; therefore it fails in getting at the saline, the oily, and starchy ingredients of ergot; besides, it is apt to take up the elements of fermentation, and gradually be converted into propionic acid." Dr. Ronayne holds that the oils and resin extracted by the ether in the process for the officinal extract should not be rejected, but should be mixed with the aqueous extract, and that the difficulty is to get these two fluids to unite. To obviate this difficulty he employs M. Regnauld's modification of the *sirop d'éther* of the Paris Codex. The process which he recommends is as follows:—"First crush the ergot into fine powder; pour the ether and alcohol on it; allow it to rest in a stoppered bottle for twelve hours, at a temperature of 60°; then pour off, and press well the mass so as perfectly to extrude the absorbed liquid. The volatile principles being now dissolved out, boiling water is to be poured on the residuum and infused for twelve hours at about 150°, thus extracting the mucilage, salts, and extractive matters. Regnauld's *sirop d'éther* comes in to requisition now to enable us to mix the etherial tincture and the watery infusion, and this I do according to his recommendation, by strongly agitating the two with crystallized sugar, until a perfectly homogeneous syrup is produced." The author recommends caution in the administration of this preparation, as it undoubtedly possesses some poisonous properties.

Ergotæ Liquor. A new Liquor Ergotæ. By Edward Long, M.R.C.S. and L.A.H., Dublin. (*The Medical Press and Circular*, vol. viii., p. 435.)

At the suggestion of Dr. Waring Cunan, Mr. Long directed his attention to the preparation of a condensed extract of ergot, "which would be neither objectionable in taste or appearance, and at the same time be perfectly reliable and keep well;" believing that such a preparation would be a great desideratum, as the only reliable one in present use is the extemporaneous infusion of fresh powdered ergot, the officinal "extractum ergotæ liquidum" having disappointed

many. Mr. Long concluded that as water or an aqueous fluid is the best menstruum to extract its active principles, glycerine should extract all that was soluble in water, and that the peculiar properties of this substance would retain the extract in an active state. Accordingly he digested freshly powdered ergot in glycerine for ten days, with frequent shaking; on straining off the fluid it was found to be of a dark purplish colour, and nearly as thick as treacle. The mass, which was quite soft and pulpy, was then digested in spirit for ten days; the resulting tincture when filtered was reduced by distillation to the consistence of syrup, and then added to the previous solution. Each drachm of the fluid extract represents half a drachm of powdered ergot, and may be considered a dose. Several letters have appeared in the *Medical Press and Circular*, bearing testimony to the efficacy of this preparation.

Ether as an Intoxicant in the North of Ireland. Harry Napier Draper, F.C.S. (*The Medical Press and Circular*, vol. iv., p. 117.)

Mr. Draper has collected the following interesting facts:—

"The practice of ether drinking appears to be almost altogether confined to the counties of Londonderry, Antrim, and Tyrone; and the towns in which it most prevails are Draperstown, Maghera (Derry), Cookstown, and Omagh (Tyrone). Belfast is the depot to which the ether manufacturers of Dublin, Edinburgh, and Glasgow send the supplies which thence find their way into the smaller towns."

It appears that the introduction of the practice dates from about five years since. There is little doubt "that ether drinking is a consequence of the laudable efforts made by the Roman Catholic clergy in inducing their flocks to abstain from whiskey. The consumers of ether are said to be nearly all Catholics, and to belong chiefly to the class of small farmers, though the habit certainly prevails among mill hands and other operatives."

Ether is a rapid but evanescent intoxicant, it imparts no odour to the urine, but seems to be eliminated entirely by the lungs. Mr. Draper states, "I am credibly informed that at the fair of Draperstown—which appears to be the paradise of ether drinkers—the prevalent smell is not, as at country fairs, of pigs, tobacco-smoke, or of unwashed human beings, but of *ether*."

The ether consumed is that known as "methylated," being prepared from methylated spirit which is free from duty, consequently the revenue suffers if ether is substituted for whiskey. Three gallons of ether are equal in stimulant effect to ten gallons of whiskey, the duty on which at 15° under proof is £4 5*s*.; now "Omagh is said

to take about 400 Winchester quarts (equal to 250 gallons) yearly, and one Dublin manufacturer has sent to Belfast at the rate of 4000 gallons yearly. Now if, for the sake of illustration, this latter quantity be taken as the total consumption of the North, the excise suffers by the practice to the extent of £5666 per annum. These figures must, however, fall immeasurably short of representing the total consumption."

Ether Chloric. (*Journ. de Pharm. et de Chim.*, vol. xi., p. 237.)

M. Breton professor of the School of Medicine at Grenoble, communicates the following formula for this preparation, remarking at the same time that the name chloric ether is entirely discordant with the rules for chemical nomenclature—and does not at all represent its composition.

℞ Pure chloroform . . . . . 1 gramme.
Rectified alcohol at 90° . . . . . 10 grammes.

Doses of from 5 to 15 drops in half a glass of water are given. This mixture possesses a very agreeable sweet flavour and an antispasmodic action which is valuable in a great many cases.

Ether Crotonized. (Dr. Rubio.)

℞ Ol. Tiglii . . . . . ℥j.
Ether. Sulphuric . . . . . ℥j. M.

Dose: Twenty drops in an ounce of cold water with a little sugar. To be repeated in an hour if necessary for habitual costiveness.

Fluid extracts exhausted by percolation and without heat. Mr. S. Campbell, of Philadelphia, recommends strongly maceration for four days previous to percolation, using a proper menstruum in the proportion of one pint for every sixteen troy ounces. This is a return to the practice of ancient pharmacy, full details of which will be given in any black-letter upon the subject. Aromatic distillates were formerly prepared in the same manner. Mr. Campbell, however, advocates the use of glycerine as an adjunct to the menstruum, and divides officinal fluid extracts into two classes: the first, or alcoholic, with one fourth glycerine,—as buchu, lupuline, valerian, veratrum viride, and ginger. The second, the hydro-alcoholic, composed of one-half alcohol, one-fourth water, and one-fourth glycerine. This includes amongst many others, the saccharine and acetic fluid extracts, cinchona, conium, ergot, hyoscyamus, rhubarb, sarsaparilla, senna, and taraxacum. One fluid ounce of a fluid extract should represent one troy ounce of the crude drug. The details of the percolation are similar to the methods usually adopted: the powders are in a

uniform state of fineness for all substances, namely moderately coarse, and a common glass funnel is the apparatus used. It need scarcely be stated that practical experience is of infinitely more value than an elaborately contrived percolator.

Extract Rhei Siccat. The difficulty of dispensing ext. rhei, may be overcome by treating it like the ordinary scale preparations. The extract is thus prescribed in a most convenient form. Evaporate at a very gentle heat, collect and keep in stoppered bottles. Its general appearance is that of ferri potassio tartras.

Glyceratus. An American substitute for simple syrup, consists of glycerine 1 part, water 2 parts.

Hair Dye, Brown.

℞	Acetate of Lead	℥ij.
	Hyposulphite of Soda	℥j.
	Rose Water	℥xiv.
	Glycerine	℥ij.

Dissolve the acetate of lead and hyposulphite of soda in separate portions of the water, filter separately, mix the solutions, and add the glycerine.

Honey of Roses. M. O. De Beck (*Bull. Soc. Pharm. de Bruxelles*) gives a new method for preparing honey of roses, which he says has two noteworthy advantages over that prescribed by the Belgian Pharmacopœia. The first is that it does not necessitate the evaporation of the vehicle used for extraction; and the second, that no sensible alteration is produced by the influence of heat. He ascribes the success of its formation to the solvent power of the sugar contained in the vehicle of extraction. Being employed under the form of simple boiling honey, the saccharine matters of the honey acquire a powerful extractive force, due to the elevation of the temperature which must be sustained, regular and constant. The boiling honey thus dissolves all the active principles of the red roses; it deprives them of their tannin, gallic acid, and their colouring matter, and takes away the whole of their essential oil, by the formation of an elœosaccharum.

The method is as follows.

℞	Dry petals of Provence Roses.	100 grammes.
	Simple Honey	500 ,,
	White Sugar	330 ,,
	Distilled Water	q. s. ,,

Moisten the petals of the roses with three times their weight of distilled boiling water, so as to completely impregnate them with

the liquid; introduce the paste, taking care to heap it up lightly in a covered displacement apparatus. At the end of an hour's contact, pour upon the mass 500 grammes of simple boiling honey, marking 32 degrees; let them stand for an hour maintaining approximately the same temperature. Draw off the *lixiviate* and replace it by 300 grammes of distilled boiling water; let it again stand for half an hour, and collect the lixiviate which is formed. Exhaust the residue from the displacement apparatus by a sufficient quantity of distilled boiling water, until the filtration obtained, being joined to the preceding ones which have been preserved in a corked flask, produces a sirupy liquor weighing 680 grammes, and marking when cold 280 on the areometer. Dissolve in it, with the assistance of gentle heat, the quantity of sugar prescribed, in a closed vessel, and pass it through a sieve.

The honey thus formed should mark, after cooling, 37 degrees on the areometer.

Jockey Club Bouquet.

℞	Ess. Iridis.	ʒv.
	Ess. Cassie . }	
	Ess. Tuberense }	of each ʒx.
	Ess. Ambergris }	
	Ol. Bergami	ʒss.
	Otto de Rose	ʒi.
	S. V. R.	ʒxiv.

The ess. iridis is a capital body for perfumes; it is made by adding 1 pint of S. V. R. to 1 lb. of orris in coarse powder, to stand a month, and press off; or by percolation in the ordinary way.

Lime Juice has been imported from Montserrat, the Montpelier of the West Indies. The lime-tree, a native of Western Africa, thrives in this island. The crop is gathered principally in the months commencing with July and ending with February.

The plantations ranging along the shore for about two miles, extending in one direction to about 1500 feet up the mountain steeps, with space between the trees to admit of the pasturage of cattle among them.

Part of the fruit is used in the manufacture of citric acid.

When, however, it has to be shipped as fresh juice, the fruit is first carefully sorted, and the unripe or over-ripe limes rejected, and when transferred to the presses only about two-thirds of the juice is pressed out for this purpose; it being found that the last portion resulting from extreme pressure is of diminished strength and

quality. This purer juice, being run from the presses at once into casks, is immediately secured from the air, so as not to be opened till its arrival in England.

The lime-tree requires a period of from seven to ten years from the time it is planted, before it makes any considerable return in fruit.

Liniment to cure Amaurosis. (*Union Médicale.*) Dr. Sichel communicates this formula:—

℞	Alcoolate of Rosemary	30 grammes.	
	Balsam of Fioravanti	15 ,,	
	Essence of Lavender.	1 ,,	M.

A teaspoonful of this liniment forms three applications; to be rubbed during the day on the forehead and temples, in cases of amaurosis. Repeated vesicatories on the frontal and temporal regions; laxatives to be administered.

Linimentum Potassii Iodidi cum Sapone. (Nathaniel Smith.) "This liniment owes its place in the British Pharmacopœia to Dr. Rumsey, of Cheltenham, a member of the Medical Council; the formula was supplied to him from the 'Form-book' of the business with which I am connected.

"The liniment has been in use in Cheltenham for more than twenty years, and during that period has been adopted by the medical profession in this locality, as a preparation in every way more desirable and efficacious than the unguent. potass. iodid.

"The formula was copied from a *Pharmaceutical Journal* of some twenty-five or thirty years ago, with a German origin; it was then prescribed with a large quantity of spirit. As soap with spirit of wine in a solid form does not admit of being rubbed in so easily as soap with water, the water process was adopted.

"The directions of the Pharmacopœia are not sufficiently clear; for instance, no soap made with vegetable oil could answer well. If pure curd soap, which is made with Russian tallow, were used in the proportion I propose naming, and the directions for mixing followed, I think all who now condemn the preparation would extend to it a verdict exactly the reverse. I recommend,—

℞	White Curd Soap	2 oz.
	Iodid. Potass.	1½ oz.
	Glycerine	1 oz.
	Distilled Water.	10 oz.
	Essential Oil of Lemon	1 dr.

Reduce the soap into fine shreds, and melt it in a water-bath with

the whole of the water and the glycerine; when the soap is perfectly dissolved, pour it into a No. 9 Wedgwood mortar, in which the iodide of potassium has been previously reduced to fine powder; mix briskly, and continue the trituration until the mortar has become cool, and the liniment assumes the character of ice cream. Set aside for an hour; after which gently rub in the oil of lemons."

[Great discussion has arisen with regard to the preparation of this liniment, the formula given in the Pharmacopœia not having proved satisfactory.]

Linimentum Saponis. Soap for Soap Liniment. Mr. C. H. Wood has introduced a valuable preparation, reasoning from experiments originally made by Mr. Deane, that when good castile soap is macerated in spirit at a temperature below 70° F., the oleate of soda dissolves, while the margarate of soda to a great extent remains insoluble, the resulting solution being little affected by a lower temperature. If the whole of the soap be dissolved by heat, the liniment has a tendency to gelatinise on a reduction of temperature. Good soap liniment therefore should consist of a solution of oleate of soda, free from the alkaline margarate or stearate. White castile soap is soluble to the extent of 80 per cent. in cold rectified spirit, yet to produce a soap as rich as possible in oleate of soda, an oil should be selected containing the largest proportion of olein and the smallest quantity of solidifiable constituents. For this purpose almond oil is better suited that olive oil.

"The saponification of oil as commonly performed is a protracted and somewhat tedious process to conduct on the small scale. But if, instead of boiling the oil and alkali together until they unite, the oil be first treated in the cold with $\frac{1}{20}$th of its weight of strong sulphuric acid, and allowed to remain for twenty-four hours, it is rendered so soluble in liq. sodæ that its conversion into soap becomes a matter of the utmost facility. The acid mixes freely with the oil, forming a blackish-coloured fluid. On the addition of the soda this colour entirely disappears, and the soap obtained is quite white. The following is the method of procedure I have found to be the most convenient:—

℞		
	Almond oil	1¼ pound.
	Sulphuric acid	1 ounce (weight.)
	Liq. sodæ	10 pints.

Add the acid to the oil, stirring the mixture. Allow this to remain for twenty-four hours. Then pour it into the liq. sodæ contained in a clean iron vessel, and apply heat. Very shortly after it

boils, the liquid becomes perfectly bright and transparent; the fire is then removed, and the whole allowed to become perfectly cold. The soap is then found as a coherent cake floating on the top of the liquor. It is laid on a calico filter, and left to drain for several hours; or, if it is desired to obtain it perfectly free from all traces of caustic alkali, it may be redissolved in 10 pints of boiling water, and a strong solution of 5 oz. of common salt added. As the mixture cools, the soap rises to the surface; and when quite cold, again forms a firm layer, resting on the aqueous liquid. No loss of weight is thus incurred. The soap is placed on calico to drain, after which it may be submitted to moderate pressure, or melted in a tared dish, and reduced to a uniform weight of $2\frac{1}{2}$ pounds. When thoroughly cold, it forms a firm white soap, which may be cut into pieces, and kept for use in a covered pot."

Liquor Magnesiæ Carbonatis. Mr. Umney has investigated the commercial fluid magnesias of pharmacy, the result being that the strongest were about *two-thirds*, and the weakest but *one-third* the strength of the official solution. Operating on a large scale a solution could easily be produced which when filtered, and with carbonic acid in excess, would retain an equivalent of at least 5 grains of magnesia in the fluid ounce, the minimum indicated by the British Pharmacopœia. But unless considerable excess of carbonic acid could be ensured, terhydrous carbonate of magnesia would be precipitated. It has been suggested therefore, that the solution should be decreased in strength to 10 grains carbonate to 1 fluid ounce. Mr. Umney suggests two alterations in the wording of the prescribed directions: namely,—"*Force* into the magnesia apparatus, pure washed carbonic acid;" and that *about three atmospheres* be inserted after the phrase, *retained there under pressure*, the quantity of magnesia dissolved under various pressures differing considerably. The general opinion seems to be that, though there is no manufacturing difficulty in preparing liquor magnesiæ carbonatis in a comparatively concentrated form, still that such a strong solution is unstable and likely to deteriorate, particularly when in the custody of not very careful hands.

"The official 'solution of carbonate of magnesia' is a solution of the salt in distilled water charged with carbonic acid gas. It is stated to contain 'about 13 grains of carbonate of magnesia in a fluid ounce.' By 'carbonate of magnesia' is evidently intended the ordinary article of the shops, a hydrous mixture of true carbonate and hydrate of magnesium ($3\,MgCO_3$, $Mg2HO$, $4\,H_2O$). The strength of the Pharmacopœia solution is given also in terms of

oxide of magnesium, or magnesia (MgO); thus, 'A fluid ounce of it, evaporated to dryness, yields a white solid residue, which, after being calcined, weighs not less than 5 grains.' If the solution contain 13 grains of 'carbonate' per ounce, the calcined residue will weigh $5\frac{1}{2}$ grains. Speaking exactly, we may say that the official liquor, if of full strength, contains in 1 fluid ounce 19 grains, or not less than $17\frac{1}{4}$ grains, of pure trihydrous carbonate of magnesium ($MgCO_3$, $3H_2O$)—for this is the salt which crystallizes from the solution by spontaneous evaporation at any ordinary temperature."—*Attfield.*

Eight grains of carbonate of magnesia, dissolved in one fluid ounce of water (by aid of carbonic acid) would probably remain stable.

Liquor Plumbi Acetatis. Lead Acetate for Whitlow. (*Union Méd.*) The following is recommended:—

℞	Liquor Plumbi Acetatis	15 grammes
	Glycerine	25 grammes
	Distilled Rose Water	100 grammes
	Distilled Cherry Laurel Water	20 grammes.

It is sufficient to repeatedly dip the finger affected into the mixture for an hour, according to Dr. Pavesi, to destroy the whitlow, when taken at the commencement of this painful affection.

Lotion for Itch. (*Union Méd.*) Dr. Hardy communicates this formula:—

℞	Bichloride of Mercury	1 gramme
	Distilled Water	125 grammes
	Alcohol	q. s.

Dissolve a tea-spoonful in a glass of warm water to allay the irritation. Advise also baths of alum or carbonate of soda in addition.

Manna, Artificial Flake. Samples of this have been recently exhibited: in appearance it resembles the finest imported natural specimens. No crystals of mannite are found in the interstices, and the peculiar bitter taste is absent. Four parts of rectified spirit of wine poured on one part of fictitious manna and boiled for a few minutes leaves a residue resembling clarified honey; natural manna treated in the same way leaves a hard substance in irregular masses.

Milk, Condensed. Manufactured by the Anglo-Swiss Condensed Milk Company, Cham., Switzerland. Most of the water of the milk is removed by evaporation in vacuo, and is then mixed with a

certain quantity of cane sugar; four or five times its weight of water must be added to reproduce ordinary milk. It may prove useful on shipboard.

Mucilago Ol. Morrhuæ, or Cod Liver Cream. "A quarter of an ounce of elect. gum tragacanth, steeped in sixteen ounces of cold water for twenty-four hours, during which time it should be stirred occasionally, yields a fine, gelatinous mucilage, which, when mixed in any proportion with cod liver oil and simply shaken with it, permanently diffuses the oil into particles, which in vain struggle for reunion.

"It is usual to mix the mucilage and oil in equal parts, and it is further only required to sweeten, and add, as a preservative and savourer, to each ounce of the mixture one drachm of spirit of wine, to which has been added a drop of essence of lemon, the same quantity of essence of almonds, and a trifle of oil of cassia."

Mucilago Tragacanthæ. The manipulation directed in the formula for mucilago tragacanthæ does not yield satisfactory results. The particles of the powdered gum swell so rapidly when moistened, and their cohesion in this condition is such, that before each can be sufficiently separated to obtain its portion of the fluid, they get agglutinated into masses, the centres of which generally consist of dry powder, that, in preparing it in quantity, it takes days before the gum is "perfectly diffused" through the fluid.

A better plan, adopted by many dispensers for making it extemporaneously, is the following:—Put the powdered tragacanth into a dry bottle, capable of holding double the quantity of mucilage required, and moisten it with a little spirit of wine. Then pour in the water, and agitate until a homogeneous mucilage is obtained. (Martindale.)

This has been suggested as an improvement:—

℞	Pulv. G. Tragacanth.	ʒj.
	Glycerini	f. ʒvj.
	Aqua ad	f. ʒx.

Gum. primum cum glycerino in mortario tere, deinde cum aqua paulatim instill.

This will produce a mucilage *at once*, without the objectionable air bubbles incidental to agitation, and there can be no objection to glycerine. (H. E. Godfrey.)

Nychthemerum, The (maceration). The Prussian Pharmacopœia, published at Berlin, may safely be recommended to any English pharmacist desirous of being acquainted with practical German pharmacy. *The Universal*, edited by J. Rennie, date 1833, is very

scarce; there is however a French edition (Dr. Jourdan) which may readily be obtained through the usual channels. Both have of necessity the defect of bewildering by the mass of formulæ presented, hence while they are aids to the advanced student they are comparatively of little value to the learner. On the other hand, the Prussian Pharmacopœia contains alone authorised German recipes, and it is rendered still more useful by its triple index, the first including Nomina antiqua compared with Nomina nunc usitata; the second a list of names and synonyms of remedies; the third a full catalogue of popular German names. The advantage of this last index cannot be overestimated. Finally the book is a specimen of pure latinity.

In the description of spirituous distillates will be found the expressive term nychthemerum. Its derivation is obvious, *νὺξ* and *ἡμέρα*: being the same compound expression as the Decameron of Boccaccio, and it is to be regretted that the Latin construction forbade the use of the same termination. An illustration of its meaning will be found in an essentially German preparation, hence quoted,—the old spiritus theriacalis.

Sp. Angelicæ compositus
℞ Radicis Angelicæ libram unam
„ Valerianæ minoris,
Baccarum Juniperi, singularum uncias tres.

Concisis, contusis et in vesicam destillatoriam immissis adde

Sp. Vini rectificati libras sex,
Aquæ communis quantum satis.

Post macerationem per *nychthemerum*, destillent libræ sex, in quibus solve camphoræ unciam unam cum dimidia et filtra. Sit limpidus, coloris expers. (Ince.)

Official vice Officinal. Mr. Squire was the first to recognise the difference between the two words. *Official* is any formula given under authority. *Officinal* is any formula made in obedience to the customary usage of the shop (*officina*). To state that any preparation under the sanction of the British Pharmacopœia is officinal, is a misapprehension of the meaning of the word.

Pasta Camphoræ.

℞ Camphoræ . . . . . gr. 20

In mortarium lapideum immissa inspergendo spiritum vini conterendoque in pulverem tenuiorem redigatur, tunc immiceantur

Olei Oliv. Provinc.	grammes 2
Spiritus Vini Rect.	q. s.

Ut pasta consistentiæ linimenti spissioris efficiatur. Pasta in ollam vitream, epistomio claudendam, immittatur.

This paste is applied with extraordinarily good results to the dressing of open bubos, syphilitic sores, and other such wounds.

Pencils, Medical. (*Journ. des Conn. Méd.*) M. Bouilhon after pointing out the many disadvantages of the present form of medical pencils, says: "These inconveniences having been repeatedly pointed out to me, particularly by oculists, I have sought by a new method of moulding to produce pencils which shall possess a certain amount of elasticity. My mode of proceeding is as follows:—

"The substance to be used is ground to an impalpable powder and mixed thoroughly with an equal weight of melted gutta-percha. The mass thus obtained is rolled while still warm into pencils of the size desired, which will contain consequently half their weight of active matter. For *reducible* bodies, such as *hypermanganate of potash*, gutta-percha is replaced by the purest possible paraffine.

"This process enables us to obtain pencils of any size and shape. They are elastic, are in no danger of breaking in the hands of the operator, and their point, which may be made of the fineness desired, cannot hurt the organs with which they come in contact. They are easily pointed by means of a sharp instrument; but it must not be forgotten that they are formed of a sponge of gutta-percha holding the medicinal substance within it; it is therefore advisable to renew the surface from time to time, so as to lay bare fresh active matter."

Pepsine, a new Preparation of. By Edward Long, L.A.H., Dublin. (*The Medical Press and Circular*, vol. viii., p. 300.)

Considering that the quantity of starch used to produce a dry powder in the ordinary process for making pepsine is objectionable, and that it was desirable "that some convenient and certain process be discovered with definite results easily tested," the author commenced experiments which resulted in his procuring a solution of pepsine which keeps well, of certain and definite strength and agreeable taste; he calls it "Prepared Gastric Juice," or "Digestive Solution of Pepsine." To obtain this solution, the fresh stomach of the pig is washed in water until all particles of food are removed, and the cardiac end being rejected, it is cut into slips, and digested for a week in as much glycerine as will entirely cover it, then strained and filtered. The solution is about the consistence of simple syrup, of a pale sherry colour, it has a sweet taste, with the characteristic flavour of pepsine. A drachm of this solution mixed with one ounce

of water acidulated with fifteen minims of muriatic acid, readily dissolves 700 grains of moist fibrine at 100° F., "while the best of the solutions in general use," which the author tried, only dissolve 75 grains, and that not so completely under the same conditions. Mr. Long has found, contrary to a generally received opinion, that lactic acid does not answer as well in this test as muriatic, the former being comparatively inert; this tends to corroborate the original opinion of Proust in opposition to the statements of M. Bernard and Barreswill.

Pharmacy in Italy. The official report of the Minister of the Interior of Italy, states the number of pharmacies in that kingdom to be 10,005, which is equivalent to one for every 2426 inhabitants. The papal dominion, embracing 800,000 inhabitants, has 302 pharmacies; making 10,307 for all Italy.

Pharmacopœia, The Austrian. In the new Austrian Pharmacopœia, the grain and ounce weights have been abandoned, and the decimal system (*grammes*, centigrammes, and milligrammes) adopted. A commission has been appointed by the Minister of the Interior, to bring this change into general use.

Phosphorus Draught. (*Journ. de Pharm. et de Chim.*, vol. xi., p. 401). M. Méhu informs us that, after many trials, he has stopped at the following simple formula, as being the best mode of administering phosphorus:—

℞ Phosporised Oil (to have from 1 to 10 milligr. of phosphorus)	q. s.
Gum Syrup	30 grammes
Distilled Mint Water	30 grammes.

Pour into a phial of the capacity of 60 c. c. about 30 grammes of gum syrup; shake the phial, so as to moisten all the sides with the syrup. Drop into the phial the number of drops of phosphorised oil corresponding to the quantity of phosphorus prescribed, and shake quickly; that done, add the 30 grammes of distilled mint water, and shake again for several seconds.

By these means a sufficiently firm emulsion will be obtained, which can be preserved for any length of time during cold weather. The oil which has been emulsionised by the gum will, it is true, form by degrees a sort of white cream on the surface of the liquid, which will be transparent; but the least shaking will restore its homogeneousness to the draught: and this can be repeated for months when requisite. M. Méhu habitually uses phosphorised oil at 1/150 of phosphorus; but if it were necessary to prepare a draught for several days, containing several centigrammes, much more if containing several decigrammes of phosphorus, he would

advise the use of phosphorised oil 1/100, and would add a few drops of ether to diminish the odour and prevent phosphorescence.

Plaster-spreading Apparatus, New. Devised by William Martindale, Dispenser and Teacher of Pharmacy to the University College Hospital.

This apparatus consists of a trough with a false bottom, in which a series of jets from a Bunsen's burner are applied to heat the side plates, the cloth being passed under these to be covered with a layer of plaster.

A full description and engraving of this apparatus will be found. *Pharm. Journ.* vol. xi., 1, N.S.

Plaster, Belladonna. (John Balmer.) Mr. Balmer recommends a plaster made by the use of resinous extract of belladonna *root*, in preference to that made with the spirituous extract of the leaf. It is said to adhere nicely, requiring no adhesive margin; that it neither runs, exudes, nor stains the linen.

Pills, Balsam of Canada. (*Union Méd.*) The following formula for Balsam of Canada Pills is given:—

℞ Balsam of Canada	20 grammes
Calcined Magnesia	q. s.

Mix, and divide into 100 pills.

Pil. Colocynthidis Composita. (Giles.) The following formula, which resembles in its essential features the compound pill of 1851, is suggested as being, in some respects, preferable to that of any other formula yet proposed for this important preparation.

℞ Colocynth Pulp	6
Aqueous Extract Barbadoes Aloes	12
Virgin Scammony	4
Powdered Cardamoms	1
Hard Soap	3

Exhaust the colocynth with water by successive maceration; operate upon sufficient crude aloes to yield the required amount of extract; evaporate down to suitable consistence; mix in the other ingredients, and cautiously reduce to the proper consistence. The percentage results from the preceding formula will be as follows: —

Aqueous Extract Colocynth	*11·032
,, ,, Aloes	53·382
Scammony (Virgin)	17·793
Cardamoms	4·448
Soap	13·345
	100·000

* Equivalent to colocynth pulp, 26·700.

Pills, Excipients for. (W. D. Savage, Brighton.)

A.

℞ Creasoti ♏ j.
Pil. Sapon. Co. gr. iiss.
Pulv. Glycyrrh. gr. ij. M.
Six weigh 36 grains.

B.

℞ Creasoti ♏ j.
Pil. Sapon. Co. gr. iiss.
Pulv. Glycyrrh. decort. q. s.
Six weigh 42 grains.

C.

℞ Creasoti ♏ iij.
Pulv. Tragac. gr. j.
Ceræ Alb. gr. iij. M.

D.

℞ Creasoti ♏ xxiv.
Magn. Calc. q. s. M.
Into 12 pills (68 grains).

E

℞ Creasoti ♏ xxiv.
Pulv. Sapon. gr. xij.
Magn. Calc. q. s. M.
12 pills.

F.

℞ Creasoti ♏ iij.
Pil. Sapon. Co. gr. v. M.

G.

℞ Creasoti ♏ xxiv.
Pulv. Opii gr. xij.
Pulv. Sapon. gr. xxiv.
Pulv. Glycyrrh. decort. q. s.
Ft. Pil. xij.; weighs ʒij. gr. xxiv.

H.

℞ Creasoti ♏ xxiv.
Pulv. Opii gr. xij.
Pulv. Glycyrrh. decort. q. s.
Ft. Pil. xij.; weighs 84 grains.

I.

℞ Creasoti ♏ ij.
Pulv. Opii gr. j.
Ft. Pil. c. Cera q. s.

K.

℞ Creasoti ♏ xxiv.
Ceræ Flavæ gr. xxiv.
Pulv. Glycyrrh. gr. xij. M.
Into 12 pills.

L.

℞ Creasoti ♏ xxiv.
Ceræ Flavæ ʒss. M.
12 pills.

M.

℞ Ferri Sulph. gr. j.
Pil. Galban. Co. gr. iiss.
Ol. Menth. Pip. ♏ j.
Ceræ Flavæ gr. j. M. Pil.

No. 1.

℞ Creasoti gtt. xxiv.
Ceræ Flavæ gr. xxiv. M.
12 pills.

No. 2.

℞ Creasoti gtt. xxiv.
Pil. Sapon. Co. (*old*) gr. xxiv. M.
12 pills.

No. 3.

℞ Creasoti gtt. xxiv.
Pil. Sapon. Cast. gr. xij.
Pulv. Glycyrrh. gr. xij. M.
12 pills.

No. 4.

℞ Ol. Croton. gtt. j.
Pil. Sapon. Co. gr. ij. M.

No. 5.

℞ Ol. Croton. gtt. j.
Pulv. Opii ½gr.
Ceræ Flavæ gr. ij. M. Pil.

No. 6.

℞ Ext. Colch. Acet. gr. j.
Pulv. Tragac. gr. j. M. Pil.

No. 7.

℞ Hydr. Chlor. gr. iij.
Mannæ gr. j. M. S. A.

Pills, Excipients for. (T. H. Hustwick.)

A. ℞ Creasoti gtt. i.
Pil. Sapon. Co. gr. iiss.
Micæ Panis gr. iss.
Lycopod. gr. i.
Ft. Pil. i. ♏vj.

Six very nice pills of the ordinary 5-grain size, rolled out beautifully and retaining every particle of creasote.

C. ℞ Creasoti gtt. iij.
Micæ Panis gr. iij.
Lycopod. gr. i.
Pastæ Trajac. q. s.
Ft. Pil. i. ♏vj.

Made up very nicely. 3 grains of bread quite sufficient, and tragacanth paste enough to make the oil and bread thoroughly homogeneous. This being too soft to roll, lycopodium was added; they then rolled out tolerably well, and are very little larger than the ordinary 5-grain size, with all the creasote retained.

E. ℞ Creasoti gtt. ij.
Saponis gr. i.
Micæ Panis gr. iij.
P. Tragac. Co. gr. iss.
Ft. Pil. i. ♏vj.

Being much too soft after mixing the three first, pulv. tragac. co. was added, with the best effect; they rolled out well, are a very clean pill, but larger than any of the others, being the size of a large 5-grain pill. Creasote completely retained.

F. ℞ Creasoti gtt. iij.
Pil. Sapon. Co. gr. v.
Lycopod. gr. i.
Pulv. Tragac. Co. gr. i.
Ft. Pil. ij. ♏xij.

The two first making a semi-fluid mass, and lycopodium being not absorbent enough, I added pulv. tragac. co. again with good effect, as it made a good mass, rolled out well, and the two pills are of the usual 4½-grain size. Creasote completely retained.

M. ℞ Ferri Sulph. gr. i.
Pil. Galb. Co. gr. iiss.
Ol. Menthæ gtt. i.
Lycopod. gr. i.
Ft. Pil. i. ♏vj.

The first three made a mass too soft to roll; the lycopodium being added, it was then in a fit state. Makes ordinary-sized pills.

No. 4. ℞ Ol. Croton. gtt. i.
Pil. Sapon. Co. gr. ij.
Micæ Panis gr. i.
Ft. Pil. i. ♏vj.

Made up very easily into small-sized pills.

No. 5. ℞ Ol. Croton. gtt. i.
Pulv. Opii gr. ½.
Micæ Panis gr. iss.
Pastæ Trajac. q. s.
Ft. Pil. i. ♏vj.

Made rather soft pills, but as they have kept their shape there is no reason to alter the formula.

Pills, Tolu Balsam Varnish.

℞ Ether	100 parts
Balsam of Tolu	10 parts
Colophonium	1 part
Absolute Alcohol	10 parts.

Macerate till the resin is dissolved. The tolu balsam must be previously digested four hours in hot water, and then dried. To coat the pills, they are put, with sufficient varnish, into a wide-mouthed flask or a porcelain mortar, and quickly shaken round; the pills are then rapidly turned out into a silk sieve, the openings of which are about the size of a pin's head, and a continuous motion is kept up until they are dry. If necessary, a second coating may be given.

Podophyllin. Some French journals state that it is prepared by boiling the rhizome with milk of lime; adding to the filtrate a solution of sulphate of iron and zinc to precipitate the lime, and evaporating the filtrate to the consistence of an extract, which is exhausted by alcohol. The alcoholic solution is concentrated, and the residue taken up by boiling water, which, on cooling, deposits the Podophyllin.

Pomade for Amaurosis. (*Journ. de Pharm. et de Chim.*, vol. xi., p. 237.) Dr. Sichel communicates the following formula:—

℞ Black Copper Oxide	1 gramme
Prepared Lard	10 grammes.

Mix with care on porphyry. Apply to the forehead and temples four times a day, in cases of amaurosis provoked by the abuse of *tobacco*. An hour after rubbing take off the pomade. Salt foot-baths twice a week. After the use of the pomade, blisters to the forehead and temples, and repeated purgatives.

Pomade of Oxide of Zinc with Camphor. (*Journ. de Pharm. et de Chim.*, vol. xi., p. 56.) The following is Dr. Hardy's formula:—

℞	Oxide of Zinc	4 to 8 grammes
	Camphor	2 to 4 grammes
	Prepared Lard	30 grammes.

To be rubbed on the skin night and morning to allay irritation.

Pure Water. At the British Medical Association, held at Leeds, an address was delivered by Sir William Jenner, on "Medicine." Adverting to the fact, that typhoid fever and cholera are frequently generated by the use of polluted drinking water, Sir William boldly avowed that local authorities who supplied such water ought to be as amenable to actions for damages to persons whose health was injured thereby, as railway companies are for injuries to passengers.

Steedman's Soothing Powders. (Analysis.) *Med. Times and Gazette.*

Calomel	27·20
Ash	0·06
Organic Matter	72·74
	100·00

The organic matter appeared to contain a trace of opium, and to consist mainly of inert substances. 28 out of the 72·74 parts of organic matter were soluble in boiling water, leaving a brownish gum, bitter to the taste; and the remainder of the organic matter was insoluble in water.

Stedman's Teething Powders. (Analysis.)

Calomel	42·03
Organic Matter	57·97
Ash	trace.
	100·00

The organic matter appeared to be quite inert. It was soluble in water, giving a solution having no particular taste. No opium was detected. There was no corrosive sublimate. The powders vary in weight from 1·42 grain up to 2·78 grains, and contain from about $\frac{1}{10}$ grain up to about $1\frac{1}{10}$ grain of calomel, mixed with rather more than its own weight of some diluent substance.

Stedman's Powders. Dr. T. Stevenson, of Guy's Hospital, states that on examination he found the powders to consist of calomel, cane sugar, and morphia. The latter, he affirms, may be detected thus:—

"Touch the powder with strong nitric acid: it becomes studded

with orange-coloured dots. Dissolve a fragment of molybdate of ammonium in strong sulphuric acid: on touching the powder with this solution, a beautiful purple coloration is produced. That a salt of morphia, and not opium, gives rise to these reactions, may be inferred from the fact, that no opium can be detected by a lens or by the tests for meconic acid."

This statement is denied, as follows:—"Morphia is a substance which contains nitrogen as one of its constituents. It must, therefore, be obvious that if a given powder contains no nitrogen, it cannot contain morphia. I have [the original analyst] made a careful experimental inquiry, and find that Stedman's powders are devoid of nitrogen, and therefore they must be devoid of morphia. As chemists will admit, there could not be any more absolute proof of the absence of morphia than the above.

"The reducing agency of cane sugar might cause the purple tint indicated, and be mistaken for morphia."

To this a reply was given, that the presence of morphia was detected by other reagents, notably by the acetic ether process, and that nitrogen had been determined.

One last note by the original analyst (*Med. Times and Gazette*):—"Whether the morphia be present or absent, there comes on the same beautiful blue-purple tint; and if the production of this tint is to hang suspected persons, toxicology in England is at its lowest ebb."

Sugar, Powdered. The slight flavour of sugar in some pastilles. (*Rep. de Pharm.*, vol. xxvi., p. 215.) M. Menières, speaking of the deterioration of pastilles in the present time, which he attributes to the use of sugar powdered by machinery, says:—The pulverisation of sugar has always caused it to lose a little of its sweetening quality; in a small proportion, it is true, when compared with the difference which is remarkable in the sugar sawdust which we find in commerce at the present time. It would be better to reject all pastilles made in this way; but as no other kind of powdered sugar is now used, we may either accept them, or, what is much better, prepare them in our own laboratories. The same powdered sugar is used to cover medicinal sweetmeats; but there is no inconvenience in this case, as the taste is completely hidden by the covering.

It remains to be known why pulverised or sawn sugar should lose a great part of its sweet flavour. It arises, perhaps, from the friction along the circular saws of the machine, from its prolonged contact with the high temperature thence arising, so that that part of the sugar has been submitted to the beginning of torrefaction. There

would, then, be two different kinds of sugar—one sweet, the other deprived of its sweetish flavour.

NOTE.—It is matter of daily experience that white sugar, powdered however carefully in the laboratory, even by hand, and not by machinery, does lose an appreciable quantity of its sweetening quality. To such an extent is this the case, that adulteration might be suspected were there not direct evidence to the contrary.

Syrups for Aërated Waters. The following receipts, furnished by Mr. P. W. Bedford, are printed in the July number of the *American Druggists' Circular*.

I. *Sarsaparilla Syrup.*—Take of white sugarhouse syrup, 1 gallon; water, 1 pint, holding in solution one-eighth ounce each of extract of liquorice, gum arabic, and sulphate of iron. A portion of the syrup to be rubbed up with a quarter of an ounce of wintergreen and sassafras.

II. *Sarsaparilla Syrup (Parrish's).*—Take of simple syrup, 4 pints; compound syrup of sarsaparilla, 4 fluid ounces; caramel, $1\frac{1}{2}$ fluid ounces; oil of wintergreen and sassafras, of each, 6 drops.

III. *Lemon Syrup.*—Dissolve 1 ounce of citric acid in 4 of water, and add to 9 pints of simple syrup; also, add 4 fluid ounces of mucilage acaciæ, and a half fluid ounce of spiritus limonis.

IV. *Another Formula.*—Grate off the yellow rind of lemons, and beat it up with a sufficient quantity of granulated sugar. Express the lemon-juice; add to each pint of juice 1 pint of water, and $3\frac{1}{2}$ pounds of granulated sugar, including that rubbed up with the rind. Warm until the sugar is dissolved, and strain.

V. *Another Formula.*—Dissolve 6 drachms of tartaric acid and 1 ounce of gum arabic, in pieces, in 1 gallon of simple syrup; then flavour with $1\frac{1}{2}$ fluid drachms of best oil of lemon. Or flavour with the saturated tincture of the peel in Cologne spirits.

VI. *Orange Syrup.*—To be prepared from the fruit in the same manner as IV.

VII. *Another Formula.*—Dissolve 6 drachms of citric acid in 1 gallon of simple syrup, and add 2 fluid drachms of fresh oil of orange in two ounces of alcohol; or, instead of the alcohol solution of the oil, use the saturated tincture obtained by macerating the fresh peel for ten days in sufficient Cologne spirits to cover. The lemon and orange syrups, made from the fruit, after being strained, may be diluted with an equal bulk of simple syrup. One dozen of the fruit is sufficient to make 1 gallon of finished syrup.

VIII. *Ginger Syrup.*—Mix 2 fluid ounces of tinctura zingiberis with 4 pints of simple syrup.

IX. *Vanilla Syrup.*—Mix 2 fluid ounces of fluid extract of vanilla with 4 pints of simple syrup.

X. *Syrup of Coffee.*—Pure coffee, roasted, half a pound, is infused in boiling water, half a gallon; enough is filtered off to make half a gallon of infusion, in which dissolve 7 pounds of granulated sugar.

XI. and XII. *Strawberry and Raspberry Syrups.*—Mash the fresh fruit, express the juice, and to each quart add $3\frac{1}{2}$ pounds of granulated sugar. The juice, heated to 180 degrees Fahrenheit, and strained or filtered previous to dissolving the sugar, will keep for an indefinite time.

XIII. *Pineaple Syrup.*—Same as XI. and XII.

XIV. *Nectar Syrup.*—Mix 3 parts of vanilla syrup with 1 each of pineapple and lemon syrup.

XV. *Sherbet Syrup.*—Mix equal parts of orange, pineapple, and vanilla syrup.

XVI. *Grape Syrup.*—Mix half a pint of brandy, quarter of an ounce of spirits of lemon, and sufficient tincture of red Saunders, with 1 gallon of simple syrup.

XVII. *Cream Syrup.*—Borden's condensed milk, 1 pint; water, 1 pint; sugar, $1\frac{1}{2}$ pounds. Heat to boiling and strain.

XVIII. *Orgeat Syrup.*—Cream, syrup, and vanilla syrup, each 1 pint; oil of bitter almonds, 4 minims.

Syrup. Ferri Hypophosphit. Syrup of Hypophosphite of Iron. (*Bull. Soc. Pharm.*, 1870, 205.) The following method is given of preparing a syrup which contains iron in the form of hypophosphite of protoxide, and in which the proportion is very exact.

℞ Sulphuric Acid at 66°	25 grammes
Hypophosphite of Barytes	71 grammes
Coarse Iron Filings	q. s.
Distilled Water	250 grammes
Sugar	600 grammes.

Pour 200 grammes of water while boiling into a porcelain capsule, and dissolve in it the hypophosphite of barytes. While the solution is still hot, pour into it by small portions at a time the sulphuric acid mixed with 50 grammes of distilled water. Stir the mixture and heat it until it boils, so as to give cohesion to the sulphate of barytes then formed, which will facilitate filtration. Let it stand a few moments, and then throw the whole of it on to a filter; wash the precipitate in a sufficient quantity of warm distilled water, to yield a solution of hypophosphoric acid of 300 grammes weight. Take a flask of sufficient size, fit into it a cork with a tube, twice bent, through it; put into the flask 35 or 40 grammes of iron fil-

ings free from oxide, pour into it the solution of hypophosphoric acid, close it with the cork, and plunge the free end of the tube into a glass containing water.

The solution of the iron is performed according to the mode common to metals of the third section, that is to say, it forms a salt of protoxide and evolves hydrogen. Allow the reaction sufficient time to be completed. The hydrogen fills the flask, and when the evolution ceases, all external communications being intercepted, the entrance of the air is no longer possible; thus the solution of hypophosphite of iron remains secure from oxidation. Let it settle, then pour off the syrup on to a sieve. Put the syrup while still warm into a bottle, which must be filled as full as possible.

In preparing syrups of hypophosphite, it takes the place that Dupasquier's solution does for syrups of *iodide* of iron. For example by taking

Syrup of Hypophosphite of Iron . .	100 grammes
Simple Syrup	900 grammes,

a syrup is obtained containing 5 grammes per kilogramme of salt.

Syrupus Ferri Iodidi. Mr. Beardsworth recommends the addition of citric acid, one grain to the ounce, to syrup prepared according to the Pharmacopœial process.

"Syrup made many months ago, and having been kept in a stone bottle without any light, had gone a very deep amber colour. This was put in three different bottles, one a twenty-ounce green stoppered bottle, one a twelve-ounce ordinary blue medicine bottle, and the other a small white two-ounce phial, halfway round which was put a piece of clean white paper, so as to traverse the whole *length* of the bottle, but only reaching halfway *round* it.

In each *citric* acid was put in the proportion of one grain to the ounce. After two days I examined the three bottles when I observed the following:—

That syrup in the twenty-ounce *green* bottle was about one half as much discoloured as originally. That in the twelve-ounce medicine phial was still clearer than the last, in fact was *almost* clear. That in the small two-ounce white phial was perfectly clear, and is so yet. There was, nor is not any skim on the surface, neither was there any precipitate.

No. 3 was syrup out of the same large jar as the last, and with citric acid in the same proportion; but instead of being put in a white bottle, it was put in an ordinary deep blue syrup bottle. Several days after putting the syrup in the bottle, and keeping it in the dark, I examined it, and found it was slightly bleached; and,

although kept in the same position, it does not become any clearer than it has been before."

A *bright* light, combined with citric acid in the above proportions, seems all required to clarify, decolourise and keep the syrup clear. Mr. Carteighe states, "that if the syrup is heated rapidly to boiling, before adding the iodide solution, the preparation has less colour than if made at the lowest temperature at which sugar will dissolve." Mr. Haselden confirms the statement as to the bleaching properties of light. Professor Redwood is of opinion that this syrup, carefully prepared with pure sugar, and in strict accordance with official directions, will keep uncoloured for any reasonable length of time—a fact which is abundantly confirmed by the experience of other pharmacists.

Syrups, Frothy. (Californian recipe.) Shake one white of egg with two gallons of any cold acid syrup, a persistent foam is produced and a nice flavour imparted.

Syrup of Ipecacuanha and other Syrups. (J. B. Moore.) Experiments have been made by Mr. Moore to improve the preparation of these remedial agents, which once fell into disrepute owing to their imperfect character. They have an unfortunate tendency to spoil, and it is to their keeping as well as to their medicinal properties that attention has been directed. It may be remarked that both in Paris and London many syrups are presented, the manufacture of which it would be difficult to improve. The cold process (*à froid*) is in several cases found of essential service. Mr. Moore gives the following formula for syrup. flor. aurant:—

℞ Aq. Flor. Aurant. (filtered) . . . . . one pint
Sacchar. Alb. (coarse powder) . . . 30 troy ounces.

Mix without heat and strain through muslin. [The advantage of this over the elegant preparation of the British Pharmacopœia is not apparent.] A new mode is advocated for the syrup of ipecacuanha. [Pharmacists must be cautioned when dispensing French ordonnances to adhere strictly to the Codex.]

Syrup Ipecacuanhæ.

℞ Pulv. Ipecac. . . . . ℥ij.
Acid Acetic. . . . . m 60
Glycerine . . . . . ℥viij.
Pulv. Sacch. Alb. (coarse). . . . . ℥xviij.
Alcohol . . . . . } āā q. s.
Aquæ . . . . . }
Alcohol dilut. . . . . }

"Moisten the ipecac. with alcohol; pack it firmly in a cylindrical

glass percolator, then gradually pour upon it, first, two fluid ounces of alcohol; when this has been absorbed, pour on gradually eight fluid ounces of a mixture consisting of two parts of alcohol to one part of water, and when this has all passed from the surface, continue the percolation with diluted alcohol until ten fluid ounces of tincture have been obtained, observing to set aside in a plate or shallow dish, in a warm place, the first two fluid ounces which pass, that they may evaporate spontaneously to a syrupy consistence. Then mix the acetic acid with the remainder of the percolate, and evaporate carefully in a water bath, with frequent stirring, until reduced to two fluid ounces and a half; add to this the reserved portion, and mix the whole with ten fluid ounces of water, and continue the evaporation until the mixture is reduced to twelve fluid ounces. To this, in a bottle, add the sugar; shake occasionally, and when dissolved add the glycerine, and strain through muslin. A bright beautiful syrup results, and from our own experience it seems to keep without any particular precaution. The acetic acid is added by the suggestion of Professor Procter to fix the emetia during the concentration of the tincture."

Nursing Syrup and Worm Lozenges. (Henry C. Morse.) Stated as the genuine formulæ.

Mrs. Wheeler's Nursing Syrups:—

℞	Sacchari	℥xxxv.	
	Liq. Calcis.	℥xl.	
	Ext. Papav. Fluid	℥iv.	
	Ol. Anisi	℥j.	
	Ext. Podophylli Aquat.	℥ss.	
	Spir. Rectif.	℥ij.	M.

Mrs. Wheeler's Worm Confections:—

℞	Hydrarg. Chlorid. Mitis	℥j.	(Calomel).
	Sacchari	℥x.	In pulv. subtill. tere.
Adde	Sacchari	℥xxv.	
	Santonini	℥vj.	

Misce et fiant. rhom. (tablet) No. 360. The syrup contains about two drops extract papaveris fluid, in each teaspoonful; and the confections contain one grain santonin and one-sixth of a grain of calomel in each tablet.

Extract podophylli aquati is of the same strength as the ordinary fluid extracts: 16 ozs. troy to the pint.

Tinct. Odontalg. (M. Magitot.)

℞	Chloroform	5	
	Laudanum	2	
℞	Benzoin	10	M.

Apply with cotton wool.

Tincture of Acetate of Iron. The following formula has been proposed :—

℞ Liq. Ferri Persulph. . . . . 2½ oz. (fluid).
Liq. Ammoniæ . . . . . q. s.

"The precipitated oxide of iron, after being thoroughly washed, and pressed as dry as possible, is to be dissolved, without heat, in 520 grains, or, approximately, 9 fluid drachms, of glacial acetic acid, and the solution diluted with distilled water to 5 fluid ounces. One part of this, with three parts sp. vini rect., will represent the tinct. ferri acetatis, B. P. In this way a very elegant and convenient preparation may be obtained, which will keep for a considerable time; samples so prepared having been kept over twelve months without any change beyond the formation of a small quantity of a crystalline deposit, which, however, is entirely soluble on dilution with either sp. vini rect. or aq. destillata; the solution is, in fact, slightly supersaturated, but it was found that any attempt to make a more dilute solution, such as twice or thrice the strength of the tincture, interfered with its keeping properties."

Tinctura Rhei Aquosa in the solid or dry state. E. Baumann prepares a tincture of rhubarb, which he evaporates; when it has arrived at a syrupy consistency he adds pure quartz sand which has been dried and sifted from the most finely divided particles, and continues the evaporation to dryness. For use, the preparation is dissolved in water and put in a glass cylinder; the sand, if not too fine, rapidly settles to the bottom, and the clear solution is then decanted.

Tinctura Rhei Aquosa, Hager's Centralhalle on. The sliced root is macerated several times in water, the liquid pressed out, after addition of potash is evaporated almost to dryness. This extract, which is of the consistency of pill-mass, is dissolved in cold water. This solution after standing some days if not too concentrated, filters well, and is then a second time evaporated. According to the amount of root used and the weight of the extract, it is calculated how much is necessary to make a tincture, and the corresponding quantity of cinnamon-water is added. The extract dissolves very readily, and gives in about a quarter of an hour a beautiful clear tincture.

Another method. About six ounces of rhubarb root are infused hot with six pounds of water, and two ounces of carbonate of soda are added; infuse for half a day, decant as soon as clear, allow to stand half a day, so that the liquid becomes thoroughly clear, and evaporate to dryness in a water-bath. Leave the extract to dry in a drying cupboard till it can be reduced to the state

of a coarse powder. For use, dissolve twelve grains in an ounce of water, and a fresh tinct. rhei aq. is thus always quickly prepared in a way that leaves nothing to be desired.

Waters, Natural Mineral. The increase of the importation of natural mineral waters is remarkable, and there is a tendency amongst the medical profession to prescribe certain of these in preference to artificial combinations. Vichy may be cited as an instance, and its therapeutical value is beyond question. Pullna is equally ordered from the natural spring and as an artificial compound. Art has superseded nature with regard to Seltzer; the natural spring declined to effervesce. Lately two waters have more than retained their reputation: Pullna, which comes from Bohemia, not far from Teplitz; and Friedrickshalle water, from the duchy of Saxe-Meiningen, not far from Coburg. Enormous quantities of both are imported. The Friedrickshalle contains alkaline sulphates, carbonates, and chlorides, with a small quanity of bromide, and some free carbonic acid. The taste is far from unpleasant. Half a tumbler generally suffices for a laxative dose. [There is no practical pharmacist who would not bestow his most cordial approbation on this class of remedies. In the case of those who have passed a certain age they act most beneficially. The natural spring of Vichy has, to our knowledge, soothed much bodily suffering and saved life.]

Carlsbad. The Sprudel. In 100·00 parts. (Yeo.)

Sulphate of Sodium	19·48
Sulphate of Potassium	12·2
Chloride of Sodium	11·36
Magnesium Salts	0·52
Carbonate of Soda	11·8
Carbonate of Iron	0·04
Carbonic Acid	10·123

Vichy Water. Grande Grille. In 100·00 parts. (Yeo.)

Carbonate of Sodium	36·54
Chloride Sodium	5.43
Sulphate Sodium	0·168
Sulphate of Potassium	3·362
Salts of Magnesium	2·0
Carbonate of Iron	0·02
Carbonic Acid	26·65

THE MICROSCOPE AT FAULT.

AN EPISODE. BY W. W. STODDART.

TRAVELLERS meet with strange bed-fellows, and so in another sense do microscopes. The general observer must sometimes have met with objects that puzzle and perplex, and so it was with the author a few months since.

The tale that is now told is intended as a finger-post of caution for young students, and such must be the apology for its introduction.

The inquirer after the hidden things of nature is always encountering circumstances of time and place that only a patient waiting can explain. Whether chemical, mineralogical, or botanical, all are the same in putting forward, as it were, stumbling-blocks to check the too rapid course of the eager pursuit after knowledge. Who is there that has not reluctantly been obliged to place a choice specimen in his cabinet with no other memorandum than the locality, the genus and species to be afterwards filled in when some future and fortunate explanation may unravel the mystery of its nature and classification? Just so was it with the author, and in a very remarkable manner.

Living in a large seaport town, many are the opportunities for getting curious objects from seafaring men who will take the trouble to bring them home to the naturalist, treasures both from land and sea. Many such kindnesses has the writer to acknowledge, and many have been the sources of instruction in which he has revelled, and for all of which he has been indebted to the kind-hearted sailor.

Some time ago one of these aids to science brought for the "doctor" a piece of churrus from India. Wishing to examine this curious exudation from the leaves of the *Cannabis Indica*, and to compare its physical properties with our official extract, a piece the size of a large nut was divided into several portions. One was placed in alcohol for solution and spectroscopic treatment, another was examined with that real vade mecum, the pocket-lens. A strong, bright, powerful *rush* of sunlight started several shining but small sparkling points which reflected the light with almost the magic brilliancy of the diamond.

Now for micro-crystallography, and for the discovery of some new alka'oid! Do none of our readers realize the feelings of such a moment?

The resin was eagerly scraped, placed under the familiar binocular, armed with a dear old Ross's one-inch. But alas! the well-known

question that rivals Cæsar's impedimenta arose; What is it? What can it be? Threads of glassy transparency adhering to the resinous mass started into view, shining with magic splendour.

The whole piece was plunged into alcohol, the threads separated and well washed, and again examined. Still no result. Could they be hairs from some animal, for they appeared to have an epithelial covering? Hardly that, for the fractured end of the thread was convoluted, and looked like the section of a fairy's cigarette.

It is true that when cruelly burnt in the flame of a spirit-lamp it frizzled, and shrivelled, and had a peculiar smell: that looked like animal. But then strong nitric and hydrochloric acids did not dissolve it; and fused with the blowpipe with an alkali, a glass was formed: that looked like a mineral. What could it be? Chemistry was at a discount, and our own familiar friend, the microscope, was again tried. A few filaments were placed in a test tube, warmed with liq. potassæ, washed with aq. destill., and examined with a one-sixth.

A wondrous transformation arose, and a still greater surprise came to light: instead of threads, a multitude of exquisite little crosslets, and stars, and clubs, and spears of the most elegant forms appeared; some studded with bosses, some with spines, single and double; some were straight, others were curved, and in short variety seemed the order of the day. Placed on a blue selenite stage, and viewed with polarized light, the whole seemed changed into the most lovely little gems. Again, what could they be?

Were they the spirits of sponges or gorgoniæ? Choice and rare specimens were withdrawn from the cabinet for comparison, and eagerly scrutinized. But all in vain; nothing half so beautiful was there. Indeed, how could sponges or gorgonias get access to the Himalayas or Herat?

A scientific friend, remarkable for his positivism, confidently affirmed that they were hairs from the cuticle or raphides from the tissue. At first sight this seemed to promise a speedy solution of the problem. But what plant had so many kinds of hairs on its epidermis? Certainly not the Indian hemp, so that idea was settled. Next the raphidian theory was put on trial. The fact that some of the little bodies were facsimiles of the well-known dumb-bells of calcium oxalate raised our friend's hopes.

Bentley, Balfour, Queckett, and Lindley were ransacked, but no such forms were there. But then they were insoluble in strong acid and fused with alkali: they must be silica! No raphides were entirely siliceous, so that idea would not hold good.

What could they be? It seemed

> "One of those mysteries which heaven
> Will not have earth to know."

The beautiful little strangers were eventually entombed in Canada balsam, labelled "Calcutta," and placed in the microscopic cabinet to remain simply as beautiful objects.

Our thoughts had drifted into a different channel, when a few weeks afterwards, who should peep in but our marine friend, to say good-bye before starting for another voyage, and to inquire if I had any more commands for the Indian Ocean.

Twelve months elapsed before our hard-fisted friend reappeared. Sure enough, in his hand was my humble little soap-box. It may easily be imagined that many minutes did not pass before it was unbound and opened.

On the very top of Venus, Strombus, Scalariæ, and twenty other shells that would have delighted Mr. Gwyn Jeffreys, lay a dazzling coil of what seemed spun glass. What is it? again proceeded, as in former days. "Oh," said my informant, "it is only a glass rope which grows at the bottom of the sea." A strange shudder ran over one's body, and a suspicion through one's mind, with marvellous rapidity.

Without loss of time a few of the glassy shreds were consigned to the test tube, amid the tender mercies of liq. potassæ, and in a few minutes spiculæ were seen under the lens, identical in every respect with those adherent to the lump of churrus.

Eureka! the mystery was solved, and an inquiry instituted, disclosing the humiliating and simple fact that our kind friend had put both the churrus and the glass rope into the same pocket, and hence our problem.

The glass rope is the *Hyalonema Suboldi*, an exquisite member of the *Spongidæ*, and is brought from the Japanese seas.

Thus it was that two things, the one the juice of a plant, and the other an inhabitant of the deep, were united in friendly union by the pocket of a mariner's coat.

The moral of my tale points out a warning to those who too hastily come to a conclusion, and judge from appearances. Perhaps this caution is more necessary for the microscopist than for any other observer. Errors are amplified like the object itself. If, as is most usually the case, only the $\frac{1}{10}$th of an inch is seen at one time, and fills the whole field of view, a speck of dust, or a particle of some foreign body introduced by an unwiped needle or unwashed slide, will make a vast difference, and may give rise to startling absurdities, although so mere an atom.

Errors of interpretation, as Dr. Carpenter truly calls them, can

only be corrected by a large amount of general knowledge. In the words of Dr. Carpenter, "The suspension of the judgment whenever there seems room for doubt, is a lesson inculcated by all those philosophers who have gained the highest repute for practical wisdom, and it is one that the microscopist cannot too soon learn, or too constantly practise."

Truly Dr. Tyndall's "scientific use of the imagination" is here of little use.

Such a lesson is one among many that the author has learned, and is his excuse for bringing it before the notice of his brethren who love to

> "Find
> Exhaustless matter for our privilege,
> Our glorious privilege, of reading God
> Amid His bright creation."

SECTION III.

MATERIA MEDICA

(*American term, Pharmacognosy*).

Almond Oils, Official and Commercial. Besides the true almond oil there occurs in the market an oil obtained from peach-stones. It is prepared, amongst other places, at Hamburg, and is described in price lists as *ol. amygdalarum optimum* or *verum*.

In order to distinguish the true oil from that prepared from peach or apricot kernels, shake together violently in a test tube, equal volumes of the oil and 25 per cent. nitric acid. The emulsion separates on standing into two layers. There is no colouration in the case of almond oil: even after many hours' standing, or warming the mixture to 60° C., only a faint yellowish white tint is developed. Oil from peach kernels, on the other hand, becomes immediately yellow with nitric acid, and the colour quickly assumes greater intensity until it becomes reddish yellow. Mixtures of the two oils, in which the false one occurs only in trifling quantity, assume the reddish yellow colour after one hour's standing. To ascertain whether any other oil has been mixed with the almond oil, place 8 or 10 drops on a porcelain dish, and 5 to 6 drops of pure sulphuric acid; stir together with a glass rod. Almond becomes red, and so remains; other oils are at first yellow, but quickly change to a greenish, greenish yellow, or brown tint.—*Hager's Centralhalle.*

Buxine. (Dr. Flückiger.) The composition and properties of this body, as occurring in the bark of the tree in question, have

been investigated by Maclagan, Tiley, and Von Planta,* who assigned to it the formula $C_{19}H_{21}NO_3$. I have prepared bibirine in a state of purity by exhausting with ether the crude alkaloid. The purified bibirine, as left after the evaporation of the ether, was dissolved in acetic acid, precipitated by potash, and repeatedly submitted to this treatment. A white amorphous powder was finally obtained, the neutral acetate of which shows the following behaviour. The concentrated watery solution is not precipitated by tartarated antimony, but affords abundant white precipitates on the addition of phosphate of sodium, nitrate, iodide, or iodohydrargyrate of potassium, perchloride of mercury, platino-cyanide of potassium, or of nitric or iodic acids. The acetate of bibirine further yields yellow precipitates when mixed with solutions of red or yellow prussiate of potassium, chromate or bichromate of potassium, or bichloride of platinum. All these precipitates are amorphous, the platino-cyanic compound alone becoming crystalline after some hours. The pure bibirine gave, upon elementary analysis, the following percentage: carbon 71·61, hydrogen 6·73. The platinum compound left behind 19·22 platinum.

There is another alkaloid, *pelosine*, the properties ascribed to which seem to accord with those of bibirine.

Pelosine was discovered in 1838, by Wiggers, and found by Bödeker (1849) to answer to the formula $C_{18}H_{21}NO_3$. It was first extracted from the roots and stems known in pharmacy as *Pareira brava*, and commonly attributed to *Cissampelos Pareira* L., a climbing shrub of the order *Menispermaceæ*, distributed throughout the tropical regions of the whole world. It has been pointed out, by my friend Daniel Hanbury, in a note in the "Pharmacopœia of India," that this derivation of Pareira brava is entirely erroneous; and a comparison of authentic stems and roots of *Cissampelos Pareira* L., collected in Jamaica and presented to me by Mr. Hanbury, with the ordinary Pareira brava of commerce, enables me to confirm his observation.

The materials which have afforded me pelosine are the stems and roots of *Cissampelos Pareira* L., and those of *Botryopsis Platyphylla* Miers, the latter collected by Dr. Peckolt, at Cantagallo, in Brazil. The latter constitute an excellent sort of Pareira brava used in Brazil, but not the ordinary Pareira brava of the English shops, the origin of which drug is, in fact, still uncertain. From the stems and roots, both of the *Cissampelos* and *Botryopsis*, I have obtained pelosine. The wood was cut in pieces, and ground without employing considerable force. By this means, the softer tissue of the bark and the medullary rays were almost completely separated from the more

* Gmelin's Chemistry, vol. xvii., p. 170.

resistant tough woody prosenchyme, the latter being very poor in alkaloid. The coarsely-powdered parenchymatous part thus obtained is then exhausted with water, to which a little acetic acid may be added. In this solution, caustic alkalies or their carbonates produce an abundant precipitate, which is dissolved by ether. In order to purify it, the precipitate may, however, be collected, washed, dried, or not, and redissolved either in acids or ether. Another process may be founded on the solubility of pelosine in carbonic acid: on expelling this acid, the alkaloid is precipitated. By either of these methods it can at last be obtained as a white amorphous powder; the yield, even of the bark only, is very small, amounting to not more than half per cent. at best. Yet commercial Pareira brava affords far less, or more commonly, none at all. This fact consequently shows that true Pareira, derived from *Cissampelos Pareira*, ought to be introduced instead of the usual drug, which, on account of its want of alkaloid, is probably quite useless.

Cinchona, Chemistry and Physiology of. (Extract.) Mr. John Eliot Howard, in his "Quinology of the East Indian Plantations," discusses a variety of subjects connected with the culture of cinchona in India, such as the acclimatization of the various species, the elevation above the sea-level at which the culture proves most successful, the effects of protecting with moss the stems from which the bark has been removed, the mode in which the bark is renewed, the chemical constitution of the wood and leaves of cinchona, etc. The so-called *mossing-process*, which, simple as it is, seems likely to play an important part in cinchona-culture, consists in covering with moss the portion of stem from which a strip of bark has been carefully removed.* The wood thus laid bare exudes a delicate cellular tissue, having the aspect of minute gelatinous drops, which, gradually increasing and hardening, ultimately forms a continuous layer of new bark. And now comes the interesting fact, that this new bark is richer in alkaloids than that which is replaced; and bark of the second renewal is richer than that of the first, and of the third than that of the second. "Is this state of things," says Mr. Howard, "to last and become permanent, so that by continually stripping the trees of portions of their external covering, it should become in the same proportion more rich in the very product that we need? This seems very improbable, yet it is the conclusion to be arrived at from the above experiments."

The increase of alkaloids, let me observe, is not trifling, but in extreme cases is almost double. It is also stated that bark the third

* The *entire removal* of the bark from a stem is a destructive practice never adopted in India.

time renewed is better fitted for the extraction of quinine than normal bark, and yields the alkaloid in a state in which its purification is singularly easy.

Mr. Broughton made experiments on two trees of *Cinchona succirubra*, which showed that when the trunks were deprived of light for some months, by being covered with tinned plate or black cloth, the amount of alkaloids increased more than 50 per cent.; the proportion of quinine, however, remained almost stationary, the increase being in the shape of cinchonine and cinchonidine. In bark renewed under moss, an improved proportion of quinine is found.

The cultivators of madder are in the habit of covering up with earth the lower portion of the stems of the plant, finding by experience that deprivation of light tends to develope the peculiar colouring matter for which the plant is valued. It has been observed by Decaisne, in examining microscopically the roots and stems of madder, that the cellular tissue of the former contains a yellow liquid, while that of the latter is filled with green colouring matter; and he has been able to prove, by experiment, that it is possible to change at discretion the production of chlorophyll, and to cause the elaboration of the colouring matter of the root in its place. It happens in this case, observes Mr. Howard, that the green portions, which, when exposed to light, absorb the carbonic acid of the air whilst disengaging oxygen, absorb, on the contrary, when deprived of light, the oxygen of the atmosphere which surrounds them, and replace it with carbonic acid. Does not something analogous take place in the red bark tree, the shading of the stem of which is attended with such manifest advantage?

In Mr. Broughton's "Report to the Madras Government," the following interesting fact is related:—Among the Crown bark-trees (*Cinchona officinalis* L.), raised from seeds collected by Mr. Cross, there were observed to be a few having narrow lanceolate leaves, and a somewhat different aspect from their companions. A comparative analysis of the bark of these two forms of cinchona (growing side by side, and raised, as it would seem, from the same lot of seeds) afforded this interesting result,*—that that of the tree with lanceo-

* Mr. Broughton's analysis of these barks may be thus stated:—

	Bark of tree with lanceolate leaves.	Bark of adjoining trees of *Cinchona officinalis*.
Quinine	7·15	2·06
Cinchonine and Cinchonidine	0·85	2·42
Total of alkaloids per cent.	8·00	4·48
Sulphate of Quinine obtained crystallized	7·37	*undetermined.*

late leaves contained 8 per cent., or nearly 3½ times as much alkaloids as that of the neighbouring trees of ordinary *Cinchona officinalis;* nine-tenths of these alkaloids being quinine, while in the others *less than half* was quinine. No finer quality has yet been offered.

Classification of Cinchonas. Mr. H. A. Weddell states that the classification of cinchonas presents difficulties from the following circumstances:—1. There is no botanical character which serves to divide the genus into sections. 2. Except in a very few instances, it is impossible to distinguish accurately one species from those nearest allied by means of a single character; it can only be done by an assemblage of characters. 3. The influences of soil and climate, especially variable in mountainous regions, have had special influences on the cinchonas, and from these result a number of anomalous forms which it is difficult to place in any definite position. 4. The causes which influence the form, colour, and texture of the organs, act with no less energy sometimes even in a more striking manner, on the nature and proportions of the principles elaborated within their tissues. 5. The examination of seedlings from the Indian plantations seems to show that crossing has taken place between the species, from which it may naturally be inferred that the same takes place also in the native forests, and that we have in our herbarium a number of such hybrid forms. The number of forms comprised in the genus appear to have a tendency continually to augment, and the different members to become united by connecting links, though perhaps descended from a very few primitive or typical forms. The author divides the genus into five stirpes:—1. Stirps *C. officinalis;* including *officinalis, macrocalyx, lucumafolia, lanceolata, lancifolia,* and *amygdalifolia.* 2. Stirps *C. rugosæ;* including *Pitayensis, rugosa Mutisii, hirsuta; Carabeyensis, Pahudiana, asperifolia, umbellulifera, glandulifera,* and *Humboldtiana.* 3. Stirps *C. micranthæ;* including *australis, scrobiculata, Peruviana, nitida,* and *micrantha.* 4. Stirps *C. Calisayæ;* including *Calisaya* and *elliptica.* 5. Stirps *C. ovatæ;* including *purpurea, rufinervis, succirubra, crythoderma, ovata, cordifolia, Tuayensis, pubescens, purpurescens, Chomeliana,* and *Barbacoensis.* A large number of sub-species, varieties, and sub-varieties are also enumerated.—*Annales des Sciences Naturelles. Botanique,* June, 1870.

Cultivation of Cinchona Plants under Glass in England. Mr. John Eliot Howard, who during a period of about ten years has devoted his attention to the cultivation of the cinchona under glass, has succeeded in raising some twenty species or varieties of the plant. Of these he had flowering almost simultaneously the

C. officinalis, the *colorada del rey*, the *C. Forbesiana*, and the *Howardia Caracasensis*, the latter was about ten feet high, and covered with blossom for nearly three months.

It is not of course easy in such a climate as that of England, and with the means at the disposal of the horticulturist, to reproduce the exact conditions under which the cinchona arrives at perfection. The plant is essentially a native of the mountains, accustomed to free air, and to the alternations of mist and sunshine on the slopes of the Andes. Even in its own land it languishes in the close atmosphere of the valleys, and loses much of its quinine-producing power. Then too the light of a conservatory is not that of South America. Moreover, as rain has been shown under certain conditions to contain nitrate of ammonia, ozone, nitric acid, ammonia, oxygenated water, the occasional substitution of spring water during drought cannot but be injurious to the plant, and Mr. Howard ascribes the ill-health of some of his specimens to this cause. The plant itself, though not injuriously affected by moisture (some species flourish at Darjeeling in India where the rain-fall averages 127·30 inches for the year) is most impatient of water at the roots. In the natural state these roots spread at no great depth from the surface through a loose mass of earth and decaying vegetation, from which they absorb certain mineral substances, and also gases, especially carbonic acid.

To reproduce these conditions as far as possible, Mr. Howard constructed a conservatory in which the temperature never sinks below 50° F. in winter, and in which the light, and apparently the summer heat, are regulated by means of external blinds. To prevent sudden chills, and to retain a large amount of moisture in the air, he employs a system of double glazing, leaving a stratum of air about four inches thick between the sheets of glass. The leaves of the plants are syringed with tepid water.

The soil found most suitable is composed of pure sand, rich loam, and bog earth, mixed with broken brick, and very well drained. But even these appliances are not enough. A careful study of the habits of the plants is also essential. It is necessary to encourage rather than interfere with rest at the period of hibernation or repose. And as the leaves form chlorophyll only in sunshine, and can only then obtain nourishment from the air, less water and nourishment to the roots should be supplied in dark and gloomy weather. For the same cause a high artificial temperature at night is injurious, the plants never flourishing so well as when a considerable range of temperature is allowed between the day and the night.

The proper range as between winter and summer would, Mr. Howard considers, be from 55°F. in winter to 65°F. in summer.

In some of the specimens reared by Mr. Howard the structure and colouring of the leaves are very beautiful. They are often covered with a lustrous epiderm which seems, as in the case of some other plants, to be largely composed of wax. When this epiderm is removed in any way, the leaf suffers, and the oxidation of the juices becomes apparent. From the examination of some of the leaves which are trebly-scrobiculate, it seems, in Mr. Howard's opinion, very improbable that the origin of the scrobiculation is ascribable to the attacks of insects. Insects are far from attacking that part of the leaf in preference, and the regularity and beauty of the scrobicules negatives the idea of any accidental defect.

Mr. Howard obtained some good sulphate of quinine from the bark of one of his plants, and also some cinchonine. In five very fine trees, the descendants of a sister of the same plant, Mr. Broughton found 6·20 per cent of purified alkaloids; or, sulphate of quinine (obtained crystallized) 3·46 per cent.; sulphate of cinchonidin (obtained crystallized) 1·94 also cinchonine.

Chemical and Physiological Experiments on Living Cinchonæ, by J. Broughton. (Royal Society's Abstract.) The memoir describes the principal scientific results which have been obtained during the last three years in the course of chemical work on the Neilgherry cinchona plantations. The chemical characteristics of the various parts of the cinchona plant are described. The condition in which the alkaloids are met with in the living bark is shown to be that of a slightly soluble tannate existing in the parenchymatous cells. The order of formation of the alkaloids is shown to be, 1st, uncrystallizable quinine; 2nd, crystallizable quinine; 3rd, cinchonidine and cinchonine. Reasons are adduced for thinking that the alkaloids are really formed in the tissues in which they are found. The effect of the solar rays falling on the bark, either while living on the tree or when separated, is shown to be prejudicial to its contained alkaloids. The effects of shielding the bark artificially, and the influence of elevation of the site of growth are detailed.

The question as to whether the alkaloids are substitutes for the mineral basis is discussed, and a series of experiments is described. which combine to show either that such substitution does not take place, or does so only in a very partial degree.

Cochineal, New Adulteration of. (*Journ. de Pharm. et de Chim.*, vol. xi., p. 116). M. Ernest Baudrimont informs us that all the

common modes of adulterating cochineal, such as those with talc, whitelead, lead-filings, plumbers' solder, etc., having become known, other methods of deceiving in the qualities of this article of commerce have been resorted to. Fifteen or sixteen years ago M. Baudrimont observed in a fine specimen of cochineal which formed part of the collection of the School of Pharmacy, the presence of small débris of fine fish scales, bright and iridescent, identical with the *essence de l'Orient*, covering the rings which compose the abdomen of the *Coccus cacti*. This fraudulent addition was probably too costly, as it has not been observed since.

Some months since he detected another kind of fraud, which is remarkable for the beautiful appearance it gives the product. The specimen under examination was composed of large, magnificent, very light cochineals of every form, with rings rendered very distinct by an abundant white matter lodged between the interstices, giving to the whole a characteristic grey tinge. This matter greatly resembled the whitish waxy plaster which this kind of animal naturally secretes, but which is found in much greater abundance in the *Coccus sinensis* and the *Coccus ceriferus;* only instead of dissolving in ether, as the latter would do, this substance detached itself from the insect under the influence of this liquid, and quickly formed a deposit in the bottom of the tubes in which the experiment was made. A small quantity of this deposit being gathered, its mineral nature was at once fixed upon, as it resisted the action of red heat when placed upon a sheet of platinum very highly heated. The weight of this powder and the fact of its being unchanged by fire having made M. Baudrimont suspect the presence of barium sulphate, he took 4 grammes of the cochineal, and having incinerated them, obtained a white ash weighing 0·98 gr. This, when treated with nitric acid, left an insoluble residue, which, when filtered, washed, and calcined, was reduced to 0·78 gr. He then performed some reactions on it, and observed:—

1st. That the reducing flames of the blow-pipe transformed it into a soluble *sulphide* which blackened silver.

2ndly. That its fusion with pure dry carbonate of soda gave a soluble sulphate, and a white body, insoluble in water, but acted upon by hydrochloric acid, the result being a salt which had all the properties of barium chloride.

From this M. Baudrimont concluded that the matter used to adulterate the cochineal was barium sulphate, and that the specimen contained 19·50 or 20 p.c. The rest of the ashes which the nitric acid had dissolved corresponded to 4·25 p.c. This calculation

pretty nearly corresponds with the result obtained by M. Ch. Mène in the analysis which he made of the mineral constituents of cochineal.

A remarkable feature in this adulteration is that the product does not lose its lightness, notwithstanding the addition of the barium sulphate. This must result from means used in carrying out this fraud. The commercial black variety must be taken and first swelled by means of steam, then rolled in *blanc de baryte*, prepared by precipitations so as to have a powder of extreme tenuity. The swelling by steam is proved by estimating, by means of desiccation, the proportion of water contained in this cochineal; it is 11 per cent., while it varies from at most 4 to 6 per cent., in honest specimens.

The fraudulent addition may always be detected by shaking about 2 grammes of this cochineal in a test tube, with from 4 to 5 cubic centimetres of ether. The barium sulphate will be almost entirely detached from the rings of the animal's abdomen and be deposited in a white powder. It can then be observed as above. Or by a simple incineration of the insect the same end will be attained.

Cynoglossum Officinale, Action of the Extract of. W. Marné and A. Creile have contributed to the Royal Society of Sciences at Göttingen a paper on the Physiological Action of the Alcoholic Extract of *Cynoglossum officinale*. The authors deny that this extract acts in the manner of curare, as stated by some Russian writers; they describe its action as that of a narcotic, and state that it causes death by paralyzing the respiratory organs.

Dandelion Root as an Adulteration in Coffee. (Dr. A. Vogel.) It is well known that burnt meal, etc., added to coffee, may be detected by dropping into the decoction a little iodine tincture, when the deep blue or violet colour caused by starchy matter is produced. Mixing with chicory, too, is well indicated by examining the ash of the coffee. Coffee berries give an ash 70 per cent. of which dissolves in water, while only 17 per cent. of chicory ash is soluble. There is greater difficulty in detecting dandelion root; the following process, however, is satisfactory. Stir up 2 or 3 grammes of the coffee with 20 cubic centimetres of cold distilled water; after about five minutes filter the extract, and add a few drops of a dilute sulphate of copper solution; boil, filter, and add excess of caustic potash solution till copper precipitation redissolves; the solution is now boiled again. If the coffee be adulterated the liquid assumes a brown colour, and after cooling there separates a red precipitate of cuprous oxide, in quantity proportional to the extent of the adulteration. Should the

coffee be genuine only a few flocks settle down, and the liquid becomes green. An addition of only 2 or 3 per cent. of dandelion root can be most accurately detected in this way.

Dandelion root contains 5 per cent. of sugar after roasting, but Fehling's test cannot be used directly with the coffee, as a precipitate would occur from the decomposition of the farinas contained therein.

Digitalis. Period for Gathering Digitalis Leaves. (*Schweizerische Wochenschrift für Pharmacie; Bull. Soc. Pharm.*, 1870, 164.) M. F. Schneider says: "I was accustomed to buy digitalis leaves from the herbalists of the Black Forest towards the end of May or the beginning of June, together with a few stems in blossom to make sure of having them at the desired period. It was, however, impossible to obtain from these leaves when carefully dried an infusion producing a decided reaction with tannic acid or other usual tests. A botanist of my acquaintance, formerly a physician, dwelling near the Black Forest, advised me to gather the leaves only towards the end of August or the beginning of September, as he was accustomed to do during his long practice, and even the radical leaves of the stems which are not to flower till the following year. With these leaves I obtained an infusion having a powerful taste and smell, and which immediately gave the wished-for reactions; so that it appears better that the gathering should take place at the end of the summer or in the autumn.

Ichthyocolla, Indian and Chinese. (*Journ. de Pharm. et de Chimie*, vol. xi., p. 153.) M. J. Leon Soubeiran informs us that Indian isinglass was first known to the European inhabitants of India only about the year 1839. It is now frequently offered in the London markets, and is used almost exclusively by brewers for clarifying beer. This substance is formed from the swimming bladders of several kinds of fish of the genus *Polynemus*, which is very common in tropical seas, and in the Ganges (*Polynemus tetradactylus, quadrifilis*, etc.), from the *Bola* and the *Silurus*, especially the *Silurus raita* (Buch.). The ichthyocolla of India is found under various forms:—

1st. In oval specimens about 9 inches long, 5 wide, and $\frac{1}{2}$ an inch thick, opaque, brownish outside, snow-white inside, and a little like mother of pearl when the coverings are taken off. They have a slight odour of fish, and appear to have been dried in the sun as soon as taken from the body of the fish.

2nd. Other specimens are from 6 to 24 inches long, 3 to 4 wide, and from 1-6th to 1-10th of an inch thick; whitish on the surface from having been powdered over with chalk to protect them. Many

points on the surface are rough and hard from parts of the coverings adhering to them; in other parts the surface is smooth and even; they are *translucid* or opaque; they exhale when in a mass a decidedly fishy odour. This sort is prepared in the following manner:—The bladder, being deprived of its coverings by means of the finger nails, is washed in cold water, beaten with wooden pestles, dried in the sun, and mixed with a little chunam (powdered chalk) to preserve it from insects and mouldiness; thus a thin exterior layer is made which can easily be rubbed off.

When the fishery is carried on at a long distance from land, the bladders are often dried without being prepared. To render the ichthyocolla fit for commerce, it must be opened and the internal membrane taken away as completely as possible before dessication; therefore, when on land, a large vessel is filled with these bladders and they are covered with water; after twelve hours' maceration they regain all their suppleness, and can be cleaned as if they were fresh. In order to take away easily the coloured and resistant parts without dissolving the finer parts, alum water is used (30 grammes of alum to from 20 to 25 litres of water); the bladders are spread on a cotton cloth saturated with alum; they are rolled very tightly, and left so for twelve hours before taking off the coverings, which is done by hand, pulling them in the direction of the fibres; this operation is repeated until they are perfectly white; then they are powdered over with a little chalk to preserve them. (M'Leland).

The different kinds of Indian ichthyocolla are named from their form and the parts whence they are obtained; these are Bombay or East Indian pipe, Bombay purse, Penang pipe, Penang leaf, and Singapore pipe.

The general properties of Indian ichthyocolla are those of the Russian, furnished by the Silurus, but on account of the want of skill on the part of the workmen it is of an inferior quality. Still it is preferable to the Brazilian ichthyocolla, which has a powerful odour and contains many insoluble albuminous parts.

The Chinese extract an ichthyocolla, Ju Ka, from many kinds of fish, particularly the My-Yu, *Sciœna lucida* (Richards), the Tahouang-Yu, *Otolithus maculatus* (C. Val), and the Mung-Yu, *Anguilla Pekinensis* (Basil).

The ichthyocolla of the *Sciœna lucida* is in small cakes of a yellowish white, 20 centimetres long and 10 broad, and 2 millimetres thick.

The ichthyocolla of the *Otolithus maculatus* is like the last-mentioned in appearance, but is usually in rounded cakes much

larger than the others, being 25 centimetres broad by 10 long, and 2 millimetres thick. It is much esteemed by cabinet makers on account of its great tenacity.

The ichthyocolla of the *Anguilla Pekinensis* is in long whitish ribbons from 40 to 50 centimetres long by 3 broad, and 2 millimetres thick.

Chinese ichthyocolla has also been seen in the form of yellowish balls of about 2 or 3 centimetres in diameter. No information concerning their origin has been obtained.

The following are the differential characters of the various kinds. The Chinese has not been examined, a sufficient quantity not being available :—

1. The Russian ichthyocolla dissolves instantly in warm water, leaving scarcely any residue (2 per cent. at most).

The Bengalese ichthyocolla gives quickly a slight transparent jelly with a residue (from 7 to 14 per cent.), but the specimens vary greatly.

2. The jelly of the Russian kind has a sweet, agreeable flavour.

The taste of the Indian is agreeable, but from its defective preparation is slightly flavoured with fish. That of Brazil has a strong disagreeable flavour.

3. The jelly of the Russian isinglass is remarkably firm, pure, and transparent.

That of India less firm and more transparent. That of Brazil still less firm, opalescent, and milky, on account of the quantity of albuminous matter which it contains.

Indian Gum. According to the experiments of Dumenil and Le Bœuf, Indian gum appears to be quite unsuitable for pharmaceutical purposes, but is applicable as a dressing or finish for net or lace work and silken fabrics. This gum, which is remarkable for its cheapness, has the appearance of gum arabic, but is distinguished from it by its behaviour with water. It comes from India in boxes holding about 4 cwt. The pieces are of various colours; the clearest are often mixed with or substituted for gum arabic or Senegal gum. Very careful observation shows this gum to be less transparent than the gum arabic; its surface is less fissured, shiny, and often warty; it is less easily powdered. If a portion be placed in two or three times its weight of cold water, and frequently agitated, there is formed not the homogeneous, shiny solution obtainable from ordinary gum, but a very thick, translucent, strongly cohesive magma, which even with prolonged stirring in a large quantity of water cannot be proportionately diluted. The chemical behaviour and the composi-

tion of the Indian gum proclaim it to be the same substance as the gum arabic. It is, therefore, probable that its special properties are owing to a peculiar molecular state or are dependent on the manner in which the gum is dried upon the tree.

Indian Pharmacopœia. M. Aug. Delondre has made a careful study of the Indian pharmaceutical products contained in the Paris Exhibition of 1867. He finds that the root *Aconitum heterophyllum* appears to contain no trace of aconitine; it is bitter and anti-periodic. Among the anti-periodics must also be ranged the root of *Coptis teeta*, the chyn-len of Guibourt. The *Tinospora cordifolia* (*Menispermaceæ*), or gualancha of India, is a bitter tonic, employed in the mild forms of intermittent fever. The seeds of *Sinapis juncea* possess the same properties as those of the European mustard, and are employed in the fresh state. The seeds of *Gynocordia odorata* (*Rixineæ*), the chaulmugra of the natives, furnish an emetic oil. The *Canarium commune* of India is the source of the elémi of Manilla and the East Indies, which should be distinguished from the elémi of Brazil, the product of *Icica Icicariba*, and from the elémi of Mexico, the product of *Elaphrium elerniferum.—Répertoire de Pharmacie*, 1869.

Ipecacuanha, Assay. (Professor Attfield.) A specimen of ipecacuanha was sent for assay by Messrs. C. G. Meier & Co., merchants, of London. It was a portion of six cases, about 700 lbs., received from Bogotá, the capital of New Granada. The article was not true ipecacuanha (*Cephaelis ipecacuanha*), but a variety known as striated ipecacuanha—the roots of *Psychotria emetica*,—the pieces being "neither annulated nor undulated, but longitudinally striated." Whereas, however, striated ipecacuanha is commonly somewhat soft, but pulverulent and more or less brittle, the specimen under examination was soft and elastic, like gutta-percha.

Striated ipecacuanha was analysed in 1820, by Pelletier, who found it to contain 9 per cent. of emetina, the active emetic principle. The same chemist obtained 16 per cent. of emetina from true ipecacuanha. The process he adopted was as follows:—Make a tincture of the weighed ipecacuanha (one of root, in 3 parts English rectified spirit, and 2 water), evaporate to dryness, dissolve residue in water, and, after filtering the liquid through magnesia (to saturate acids and liberate combined emetina), again evaporate to dryness; weigh the residue. This process, applied to the sample under consideration, furnished no less than 56½ per cent. of what was evidently not pure, or even slightly impure, emetina. In the place of starch, usually largely present in both true and striated ipecacuanha, and of which no trace was found, there occurred 5·4 per cent. of grape-sugar, and

34 per cent. of cane-sugar (or a substance soluble in water, and convertible into grape-sugar by ebullition with acids). In Pelletier's process of analysis this saccharoid matter would necessarily accompany whatever emetina might be present, and, if not noticed, be reported by an analyst as emetina itself. So far as known, however, more than a mere trace of sugar has not until now been noticed.

It became necessary to devise a process for the estimation of emetina, which should not be liable to err on account of the presence of sugar. The old process was simply supplemented by the quantitative estimation of the nitrogen in the evaporated aqueous solution of the alcoholic extract of the ipecacuanha; the absence of albuminoid or other nitrogenous matter than emetina was thereby insured, while all non-nitrogenous matter was excluded. Instead of weighing the final product of Pelletier's process, above given, a weighed portion of it is mixed with soda-lime, and burnt in the usual manner; and from the amount of nitrogen produced, the proportion of emetina calculated, the known percentage of nitrogen in the pure alkaloid (4·3) being the only important datum to be remembered.

A sample of true ipecacuanha, from the museum of the Pharmaceutical Society, yielded 17 per cent. of impure (Pelletier's) emetina, but only $10\frac{1}{2}$ of pure emetina; while a specimen of striated ipecacuanha, from the same source, gave $10\frac{1}{2}$ of extract, containing pure emetina, equal to $6\frac{1}{2}$ per cent. of the root. The striated ipecacuanha, sent by Messrs. Meier, affording $56\frac{1}{2}$ per cent. of what has hitherto been regarded as emetina, but which should be termed "saccharoid extract," contained only $2\frac{3}{4}$ per cent. of the pure alkaloid. Thus, through some unknown influence, this psychtoria had produced sugar where starch is usually found, and had secured less than half the average proportion of active principle.

Tabular results of analyses of true and striated ipecacuanha:—

CEPHAELIS IPECACUANHA.

Richard and Barruel.		*Magendie and Pelletier.*	
Emetina	16·0	Emetina	16·0
Wax and fatty matter	1·2	Wax	6·0
Gum and salts	12·4	Fatty matter	2·0
Resinous matter	1.2	Gum	10·0
Starch	53·0	Starch	42·0
Albuminoid matter	2·4	Fibre	20·0
Fibre	12·0	Gallic Acid	traces.
Gallic acid (traces) and loss	1·8	Loss	4·0
	100·0		100·0

Impure Emetina	17·0 per cent.	*Attfield.*
Pure Emetina	10·5 „	

PSYCHOTRIA EMETICA.

a. Brittle.

Pelletier.

Emetina	9·0
Fatty matter	12·0
Fibre, Gum, and Starch	79·0
	100·0

Attfield.

Impure Emetina, per cent.	10·5
Pure Emetina, per cent.	6·4

b. Elastic.

Attfield.

Emetina (pure)	2·75
Grape Sugar	5·39
Cane Sugar (or substances soluble in water, and convertible into sugar by ebullition with acid)	34·00
Albuminoid matter	3·02
Moisture, Fibre, Fat, and Salts	54·84
	100·00

Jalap, Tampico. (Hanbury.) The variety of jalap distinguished by the name of its chief place of export, Tampico, has of late years been brought into Europe in considerable quantities, but its botanical origin has hitherto remained unknown. Through the efforts of Mr. Finck, the Prussian vice-consul at Cordova (Mexico), and Mr. Benecke, consul-general for Prussia in the city of Mexico, some dried specimens and living roots of the Tampico jalap were obtained from the Sierra Gorda, in the state of Guanajuato (where the drug is collected), and transmitted to England. Of the roots, only one survived the voyage; but when planted, it throve vigorously, and flowered in the autumn of 1869. The plant proved to belong to the genus *Ipomœa*, but could not be identified with any recorded species; a description of it, under the name of *Ipomœa simulans*, was therefore drawn up by Mr. Hanbury, and, together with a figure, published by the Linnean Society.* The specific name, *simulans*, has been selected in consideration of the great resemblance which the plant bears, in foliage and habit, to the true jalap, from which, however, it is easily distinguished by its pendulous flower-buds and bell-shaped flowers.

Kumis of the Tartars, on the Preparation of. (Dr. Adolph Oberstein.) Kumis, an alcoholic drink prepared from milk, has lately attracted especial attention, both as a diet and a remedy in different affections of the organs of respiration and of the nervous system, so that any communication on its preparation is not without interest. The milk to be preferred is that of the mare, after which comes that of the cow. Take a day's milk and dilute with a sixth part of water and an eighth part of very sour cow's milk. An earthenware vessel, greater in height than width, is about two-thirds filled with the mixture, and covered with a wooden lid or cloth. Place in a warm place for twenty-four hours, after which whisk the

* *Journ. of the Linnean Society*, vol. xi., Botany, p. 279, fol. 2.

milk well, and again allow to stand quietly for twenty-four hours; whisk again most thoroughly, till the whole is of a uniform consistency; the kumis is then ready.

Before use, the kumis must be beaten or whisked up. It may be preserved many months in a cellar. During the fermentation, a part of milch sugar is converted into alcohol. Distillation yields a kind of spirit, which is a favourite drink of the Tartars.—*Pol. Notigbl; Hager's Centralhalle.*

Larch-fungus.—Two Products from the Larch-fungus. M. G. Henry has treated the larch-fungus by pulverising it, drying, and washing with ether, when it gives a solution which furnishes, by evaporation a solid residue. This residue appears to consist almost entirely of two substances, to which he has given the name of agaric resin and agaric acid. To the resin he gives the formula, $C_{51}H_{82}O_{10}$, and to the acid the formula $C_{16}H_{28}O^5$.—*Comptes Rendus*, Jan. 3rd, 1870.

Manna.—Historical Note on Manna. Mr. Hanbury has enumerated several points of interest respecting this substance. The nature of the Biblical manna is uncertain, the name being now applied to designate certain saccharine exudations produced in hot countries upon the stems, branches, or leaves of trees, shrubs, or herbaceous plants, belonging to various families. The manna of modern times is produced from the stems and branches of a species of ash, cultivated in Calabria and Sicily; yet in the early history of Sicily no mention is made of its production. A notion still lingers in the East of a meteoric manna which falls from heaven, an idea which has excited some discussion.

"Manna is mentioned more or less particularly by most of the Arab physicians, but the allusions are all to Oriental manna and not to that of Italy or Sicily. This is manifest from the writings of Ebn Beithar, one of the most eminent and learned men of his time, and a great traveller; and who, being a native of Malaga, would, probably, when speaking of manna, have named that of Sicily; the more so as that island, having been for nearly 250 years under Saracenic rule, must have been familiar to the Arabs of Spain. Ebn Beithar is moreover in the habit of quoting extensively from other authors. He died about A.D. 1248.

One fact may be held to prove that the Saracens could not have been entirely ignorant of the production of manna in Sicily, and it is this:—There exists a mountain near Cefalu which is called by the Arabic name *Gibil-manna*, literally *Manna-mountain*. Other mountains in the island retain the Arabic name of *gibil:* whether the

word *manna* was affixed subsequently to the Saracenic occupation, or whether, as is more probable, the whole name was bestowed by the Arab population in virtue of the trees of the mountain yielding manna, is a point I am unable to decide.

In the 13th century, Sicily was under the dominion of the Emperor Frederic II., a sovereign who appears to have been very solicitous to develope its resources, as is proved by many documents extant, relative to the affairs of the island. Thus, in a letter dated A.D. 1239, he directs that certain Jews settled at Palermo are to farm his date plantations at Favara, and to cultivate them after their own manner. He also writes about the cultivation of his vineyards, and the introduction of indigo and henna, and of divers other plants of Barbary, not then known to grow in Sicily. But, so far as I can discover, there is no allusion to manna.

Pegolotti, an Italian, who wrote *circa* A.D. 1340, has a chapter on Messina and Palermo, but does not mention manna as a production of Sicily; yet in enumerating the articles sold by the pound at the former city, he names manna apparently as a foreign production.

Further evidence of a negative sort is afforded by Giovanni di Antonio da Uzzano, who in his work called *Libro di Gabelli*, written *circa* A.D. 1442, mentions the exports of Naples and of Calabria, as wine, oil, corn, cheese, salted meat, nuts, chestnuts, soap, and oranges, but makes no reference to manna.

Manna is mentioned as an Italian drug in the *Compendium Aromatariorum* of Saladinus, printed at Bologna in 1488. Saladinus was physician to one of the princes of Tarentum in Calabria: neither the date of his birth nor that of his death is known, but it would appear that he was living between A.D. 1442 and 1458.

Contemporary with Saladinus lived Giovanni Giovano Pontano (A.D. 1426–1503), a celebrated historian, statesman, philosopher, and poet. Among his numerous writings is a work entitled *Liber Meteororum*, in which there is a poem headed *De Pruinâ, et Rore, et Mannâ;* this effusion notices in very circumstantial terms the collection of manna by the peasants on the banks of the Crati in Calabria, describing the production of the drug in language which may be rendered thus:—

. . . There in the middle of summer under a burning sun, while heat prevails, and the cloven earth gapes,—when no breeze is stirring and the humid air is still, it [the manna] gradually exudes, and, condensed as a viscid fluid, runs into drops and thickens on the thirsty leaves; and further hardened by successive suns, it acquires the appearance of wax and the taste of honey. Such as the bees obtain

by their instinctive art and mutual aid, this nature produces for the medicinal use of mankind.

In the second half of the fifteenth century flourished Raffaelle Maffei, called also Volaterranus, a learned and voluminous writer, who among other works, has left one entitled *Commentarii Urbani*, in which we find—"Manna nostra ætate cœpit in Calabria provenire: licet orientali inferior."

The signification may be, that manna first began to be collected in Calabria within the author's recollection, but that it was not considered so good as the Eastern manna.

It is to be observed that Saladinus, Pontano, and Maffei, all speak of manna as a production of Calabria, and it is evident that for a long time the drug was afforded by that region and not by Sicily.

Brassavolus, of Ferrara, describing the drugs found in the shops *circa* A.D. 1537, mentions manna as a production of Calabria.

Matthioli (1548) remarks that of manna he has only seen two sorts, the Levantine and the Calabrian.

Alberti in his "Descrittione di tutta Italia," published at Bologna in 1550, mentions manna as found in Calabria.

Garcia d'Orta (1563) and Christopher Acosta (1574) describe different kinds of Oriental manna, contrasting them with that of Calabria.

Still more significant is the fact that Fazelli, a well-known writer on Sicily (1558), in a chapter on the productiveness of the island, boasts of its wine, oil, sugar, honey, fruits, and saffron, but says not one word of manna or the manna-ash.

The manna collected was undoubtedly that which the trees produced spontaneously. That which exuded from the leaves was esteemed the best, and was called *manna di foglia* or *manna di fronda*. The second sort was that which flowed spontaneously from the trunk and branches, and was termed *manna di corpo;* while the third or commonest kind was that picked up from the ground.

Towards the middle of the sixteenth century it was found that a much more copious supply of manna could be obtained by notching the bark of the tree, and this new method of procuring the drug began to be adopted. But the innovation did not pass unnoticed, for in the year 1562 Marino Spinelli, being *protomedico* of the kingdom of Naples, set about inquiring as to the article sold by the druggists as *manna;* and as he doubtless found it no longer corresponded with that of former days, he declared, in concert with other learned physicians, that it was by no means good; and further to enforce his opinion, he procured the issuing of a public edict,

prohibiting the druggists under a severe penalty from using any other manna than that of the leaf. This law proved very injurious to the Calabrians; it was felt also to be both severe and unjust by many of the physicians, one of whom, Annibal Briganti, took up the question in a philosophical spirit, made many visits to the manna-districts, and investigated the differences alleged to exist between one sort of exudation and another. This resulted in the discovery that manna, whether spontaneously yielded by the leaves or stem, or obtained from the latter by aid of incisions, is essentially the same substance and possesses like virtues. These observations were recorded by Briganti in a long discourse written in Latin, for which, I am sorry to say, he has had very little credit; for not wholly trusting his own judgment on a subject so grave and controversial, he sent his MS. from Chieti, where he lived, to another learned man, Donatus Antonius ab Altomari of Naples, who so entirely approved of it that he immediately published the whole of it in his own name!

The custom of promoting the exudation of manna by wounding the stem and branches of the trees, must have occasioned a great increase in the production of the drug; a proof of which we have in the statement of Fiore (1691) that the sole district of Campana and Bocchiglioro affords annually 30,000 lbs. with great profit to the gatherers, and 1,100 ducats of excise to the government.

It appears therefore—

1. That the manna known in Europe in very early times was probably all of Oriental origin.

2. That manna of the ash (*Fraxinus ornus* L.) began to be collected in Calabria in the first half of the fifteenth century.

3. That the practice of making incisions in the tree in order to promote the exudation was not commenced until about the middle of the sixteenth century, previous to which period, the only manna obtained was that which exuded spontaneously.

4. That although the existence in Sicily of a mountain called by the Arabic name *Gibil-manna* would seem to indicate that manna was collected during the period of Mussulman rule in that island (A.D. 827 to A.D. 1070), evidence has not been produced to prove the fact; but that, on the contrary, it appears that manna was gathered in Calabria long anterior to its collection in Sicily.

Mustard. (*Journal de Pharm. et de Chim.*, vol. xi., p. 25.) M. Commaille gives the following notes on mustard:—White mustard belongs to the important family of *Cruciferæ*. Like all of this kind it contains sulphur among its constituents. It is allowed that a

part at least of this sulphur exists in *Cruciferæ*, and consequently in white mustard, in a state which easily yields sulphocyanic acid, represented by the formula $H\,Cy\,S_2$, $H\,C_2\,N\,S_2$, or $\left.\begin{matrix}Cy\\H\end{matrix}\right\}S_2$.

This acid contains 54 per cent. of its weight of sulphur. It is a very poisonous body when in a free state. We owe its discovery to Rinck, in 1804. In white mustard the sulphocyanic acid is combined with a peculiar base, sinapine, which has not yet been obtained in a dry state. When we try to obtain it in this state it separates into an acid, sinapic acid $C_{22}\,H_{12}\,O_{10}$, and a new base, sinkaline, $C_{10}\,H_{14}\,N\,O_2$. It will be seen that sinapine does not contain sulphur, but nitrogen, like almost all the organic alkalis. It yields highly crystallized salts.

The formula for sulphocyanide (sulphocyanhydrate) is $H\,C_2\,N\,S_2$ $C_{32}\,H_{24}\,N\,O_{10}$.

White mustard is distinguished from black by the latter having no sinapine. The sulphocyanide is found allied to another substance, allyle, which also exists in garlic. It is an alcoholic radical of which a great number of combinations are known. The sulphocyanide of allyle is represented by $C_2\,N\,S_2$. $\underbrace{C_6\,H_5}_{\text{allyle.}}$

The sulphocyanide of allyle contains much more sulphur than sulphocyanide of sinapine, which fact, no doubt, explains the cause of white mustard having a less disagreeable smell than black when decomposed by contact with water. Sulphocyanide of sinapine and sulphocyanide of allyle are both the result of a reaction of the active principle of the seeds on contact with water, caused by a fermentation which quickly shows itself, but do not pre-exist in the mustard itself. Thus the odorous and tasty principle, the volatile oil, whose use in black mustard is so well known, is produced by a peculiar body named myrosine or myronic acid combined with the potash in the seed. According to MM. Will and Kœrmer myronate of potash must be considered as affording essence of mustard, sugar, and acid sulphate of potash. We have:—

$$\underbrace{N\,C_{20}\,H_{18}\,O_{20}\,S_4\,K}_{\text{Myronate of potash.}} = \underbrace{C_8\,H_5\,N\,S_2}_{\text{Essence of mustard or sulphocyanide of allyle.}} + \underbrace{C_{12}\,H_{12}\,O_{12}}_{\text{Sugar.}} + \underbrace{K\,O.S\,O_3^{\cdot}\,H\,O\,S\,O_3}_{\text{Sulphate acid of potash.}}$$

$$= C_6\,H_5\,C_2\,N\,S_2.$$

The pungent qualities for which black mustard is esteemed can be acquired only by fermentation, which is possible only in the presence of water.

Myrosine is met with also in white mustard, myronic acid is not, whence it is impossible to obtain essence of mustard.

Myrosine with water and sinapisine yields a very different principle from the essence of black mustard. This principle is sulphocyanide of sinapine.

Sinapisine, discovered by MM. Henry and Garot, is sulphurated and crystallizable, soluble in alcohol; it is a crystalloid, like myronic acid; whilst myrosine does not crystallize, and is coagulated by alcohol, heat, and acids; like the substances which approach the nature of albumen, it is a colloid. White mustard contains much mucilage, its ashes contain 10 per cent. of sulphate of potash, proceeding in part from the destruction of the sinapisine.

The depurative properties of this seed have been attributed to the presence of sulphur, and to a specific action which does not explain much, considering the integrity of the mustard when evacuated.

If a grain of white mustard be examined with the naked eye, and with a magnifying glass, it will be found to be nearly round, slightly ridged on the surface, neither very large nor very small. If left in cold water it soon becomes thready and very mucilaginous; it acquires sensible taste, which is not disagreeable. The action of warm water produces this result much more quickly. The seeds then roll one upon another with great ease.

Its purgative property seems partially to depend upon these facts. A large seed which apparently cannot be attacked by the liquids of the stomach and intestines would, no doubt, purge more or less, but it would greatly fatigue the organs which could not bear any considerable quantity, besides which, the total surface being less, the mucilaginous principle would be diluted in only a weak quantity.

Very small seeds, like those of the poppy, for instance, would often be stopped in the long course which they have to take; soon the whole intestinal canal would be covered with them, and the mass could make no further progress.

Setting aside its irritating properties, black mustard is too small. The extreme facility with which white mustard yields abundant mucilage in water (and for that reason it should be chosen with a very thin perisperm) adds to the great ease with which the seed moves, which ease is due to its convenient size and rounded form.

The *depurative* (purgative) virtues of this seed do not appear so easy to explain, since it is excreted without having apparently undergone any modifications. But in this case appearances are deceitful.

The penetration of liquids into seeds whose perisperm is not thick

is easy enough. By *osmose* a very rapid change is made with irresistible force amongst the liquids of the soluble substances of the seed and those which surround them. It is known that according to the laws which govern dialysis, and which have been so well studied by Graham, the membranes allow crystalloids to exude (sinapisine is a crystalloid), and retain colloids (myrosine is a colloid.) It is then possible that the sinapisine is rapidly carried off from the mustard seeds although they themselves remain intact, to be absorbed by the liquids of the digestive canal, and to be thence carried by assimilation into the whole organism. Whether the sinapisine be taken as it is, or in the form of sulphocyanide of sinapine, is of little consequence, as both contain sulphur. Sulphocyanide of sinapine is, no doubt, a powerful poisonous principle; but for that very reason it is all the more sure as a medicine.

The doses must be conveniently proportioned, and must not be allowed to accumulate in the system; elimination or destruction must be made in proportion to the absorption of a fresh quantity, or else excess would soon be produced.

The weak property of black mustard and its apparent harmlessness when employed as a condiment, should not be brought forward in opposition to this argument; for here the sulphocyanic acid is not combined with a base, but with a radical, so that sulphocyanide of allyle, a very irritating body, is not a salt, but an ether, sulphocyanic ether,—that is to say, an entirely different body.

Paullinia.—Properties of some species of Paullinia. (*Bull. Soc. Pharm.*, 1870, 123.) M. L. Créteur says that the genus *Paullinia*, dedicated to Simon Pauli, belongs to the family of *Sapindaceæ*, and includes thirty species. They are climbing plants with alated leaves, flowers in bunches, triangular fruits, sometimes vesiculate, and filled with air more nitrogenised than atmospheric air. These plants belong to the most tropical regions of the globe, and serve the natives, sometimes as food, sometimes in the preparation of certain drinks, and at others as medicinal substances.

The best known are:—

Paullinia Africana (Brown). The decoction of this plant is employed in Senegambia to stop fluxes, and its bark powdered and mixed with cardemom is applied for pains in the side.

Paullinia Asiatica (L.), *Todalia aculeata* (Pers.), native of Bourbon. This plant is supposed to have febrifugal properties. Its bark has a bitter, acrid, peppery aromatic odour, and a reddish colour; it is covered with ferruginous plates, and is, in the interior, of a brownish colour and quilled like the grey cinchona. The natives of

the island use a decoction of it for rheumatism, itch, and venereal diseases.

The *Paullinia Capana* (Kunth). This plant, a native of Orinoco, produces seeds which the Indians use for the preparation of an intoxicating drink. They mix the infusion of these seeds with cassava, and when the mixture begins to putrefy, it takes a saffron tinge and a bitter flavour. They strain it, and add water.

Paullinia Mexicana (L.), or quarhmecatl of the Mexicans, possesses the virtues of sarsaparilla.

Paullinia pinnata (L.), a powerful climber, the seeds of which are used as a stupefaciant in the Antilles and Brazil, and act upon fish in the same way as the Coque du Levant (cocculus indicus.) The leaves, called cururu ape, are vulnerary.

Paullinia triterniata (L.) or *Sejania*, a parsley-like climber, the seeds of which are intoxicating.

Paullinia sorbilis. This is met with in the north of Brazil and on the banks of the river Amazon. The fruit is a capsule with several cells, *monospermes.* Its seed resembles that of the cacao. It is from these seeds that the Indians prepare the guarana, which they use both as food and as medicine in cases of relaxation and affections of the urinary organs.

The seeds are crushed between two stones, heated as in the preparation of cacao, after which they add to this coarse powder a little water, and mix with it some cacao and powdered yucca root, so as to make a paste of a cylindrical form, which is wrapped in leaves of the cocoa-tree to be dried at a fire.

This is the substance which has lately been highly recommended as a remedy for neuralgia, under the name of Paullinia.

This substance contains a great quantity of tannate of cafeine, to which it owes its properties, and not to the guaranine. M. Trousseau considered it an excellent tonic in affections of debility. Boiling alcohol at 22 degrees takes from the guarana all its active principles. The alcoholic extract thus obtained is used for the preparation of pastilles in the proportion of 22 grains to 500 grains of sugar, also for the preparation of a syrup in the proportion of 10 grains to 1000 grains of sugar.

Poison-Drug, New. M. M. Rabuteau and Peyre have been experimenting with the root of a plant in use at the Gaboon as an ordeal poison, and locally known as *m'boundou* or *icaja.* The authors state that even in very dilute decoctions it is very bitter, and appears to contain one or more alkaloids, since the aqueous decoction is largely precipitated by iodide of potassium, and also by

phospho-molybdic acid. The poisonous effects of this substance bear some similarity to the effects of brucia, but the authors state that, under certain conditions, this poison does not hurt men. Some of the lower animals are readily killed by it; a dose of 3 milligrammes placed under the skin of a frog kills it, and rabbits and dogs are killed by doses of from 15 to 25 centigrammes of the same extract introduced into the stomach.

Saffron, Falsification of. (M. Amedée Blackez, April, 1869). This saffron has a perfectly good colour, contains no admixture of carthamus or marigold, and pressure on paper does not indicate excess of moisture. Though of considerable density, neither sand nor lead are present. The adulteration consists in coloured carbonate of lime affixed to the surface of the stigmas. The chalk is easily washed out, precipitates to the bottom of the macerating vessel, and can be recognised in the usual manner by its evervesence with hydrochloric acid, and its reaction with oxalic acid.

Sandal Wood. (H. Weidel.) Ground sandal wood was boiled with water, treated with caustic potash, the liquid was filtered and precipitated with hydrochloric acid. The voluminous red precipitate was washed by decantation, pressed, dried, powdered, and extracted with cold ether. The residue left on evaporation of the dark fiery red solution was treated with alcohol. After one or two days' standing, crystals were found at the bottom of the vessel, which after rinsing with weak spirits became colourless; they were washed with cold spirits and recrystallized from hot alcohol.

Tolerably large crystals were obtained, in appearance like benzoic acid, both tasteless and odourless, insoluble in hot or cold water, slightly soluble in alcohol, difficultly soluble in ether. They are insoluble in bisulphide of carbon, chloroform, and benzole.

The chemical character of this substance, called by the author santal, is not well pronounced, and well-defined compounds are not obtained from it; it has somewhat the properties of a weak acid, like pyrogallic acid. At 100°–110° it loses water, becomes lustreless, and of a sulphur-yellow tint. Its analysis agrees with the formula $C_8 H_6 O_3$; by fusing with potash, protocatechnic acid, together with carbonic acid, are the only products of the reaction. The following equation expresses this change:—

$$C_8 H_6 O_3 + 3 O = C_7 H_6 O_4 + C O_2.$$

Santal has the same composition as piperonal and piperylic acid, which according to Strecker yield protocatechnic acid. Santal and piperonal are therefore nearly related. Fittig and Mielck regarded piperonal as a chinone.

Sugar Acarus. The *Schweizerische Wochenschrift für Pharmacie* (*Bull. Soc. Pharm.*, 1870, 209) quotes the following remarks made on this subject by Ferris Bringhurst in the fifth Annual Report of the General Association of the Philadelphia College of Pharmacy:—

All kinds of refined sugars give, with water, clear solutions of an agreeable odour, containing only a few foreign substances, amongst others dust and particles of wood; while the kinds of raw sugar, principally Cuban, yield opaline solutions with a slight odour of fermentation, and contain a notable quantity of particles of sugar cane, sediment, albuminous matter, and a greater or smaller quantity of acari. According to microscopic observations, the quantity of these last is estimated at about 250,000 in a pound. The *Acarus sacchari* is almost identical with the well-known insects in cheese, figs, and flour, and has a close analogy with the acarus of the itch. Like the latter, this sugar insect penetrates the human epidermis, and produces insupportable irritation, multiplies, and appears in the form of vesiculous or ampullaceous pustules. At the first appearance the irritation produced by these inconvenient animals shows itself on the back and at the joints of the hands. Lotions with diluted sulphuric or phenic acid are the most efficacious remedy for their destruction.

Turpentine as an Antidote to Phosporus. (*Journ. de Pharm. et de Chim.*, vol. xi., p. 63.) M. M. Curie, D.M., and P. Vigier inform us that after having experimented on rabbits and dogs in the manner indicated by M. Personne, they cannot agree with that gentleman as to the efficacy of turpentine in cases of poisoning by phosphorus. These gentlemen say: The experiments on rabbits were very simple, as these animals do not vomit, and with them it was proved that the use of the acid did not at all modify the progress of poisoning by phosphorus which former studies had taught us how to recognise. The experiments on dogs are much more complex, because these animals vomit, and there is no certainty at any given moment what quantity of poison had been absorbed. We have also been able to prove that the dogs always vomited a part of the dose administered, even when fasting, and in that case they could recover as well without the essence as with it. We have also seen that when care was taken to bind the œsophagus or to replace approximately the quantities thrown up, these animals quickly succumbed, notwithstanding the use of turpentine. M. Personne's theory is that phosphorus acts simply by taking away oxygen from the blood, and causes death by the asphyxia which results. Being imbued with this idea, he was disposed to receive favourably the observations which seemed to indicate turpentine as an antidote for phosphorus, since

this essence hinders the phosphorescence of that body. The most simple objection relates to the dose of phosphorus sufficient to cause death. According to our researches 8 milligrammes of phosphorus kill a rabbit weighing 3 kilogrammes, and this animal only dies after an interval of three to five days. Now the quantity of oxygen which 8 milligrammes of phosphorus can subtract from the blood to form phosphoric acid, the highest point of oxidation, is exactly 1 centigramme. Were M. Personne's theory true, 1 centigramme of oxygen taken away from the blood of a rabbit weighing 3 kilogrammes, that is to say, about 200 grammes of blood, would asphyxiate the animal, and could not be replaced in the course of three days by pulmonary circulation. Besides, if there were asphyxia, the blood in the arterial system would be black—as, indeed, M. Personne affirms it is; but we can affirm that it remains bright red until death, which is easily proved by opening the animal directly it dies.

SECTION IV.

CHEMISTRY.

MODERN CHEMICAL NOTATION AND NOMENCLATURE.

BY JOHN CARGILL BROUGH.

Typical Chemical Compounds. The combinations of hydrogen with chlorine, oxygen, nitrogen and carbon, respectively,—namely, HYDROCHLORIC ACID, WATER, AMMONIA and MARSH-GAS,—furnish the primary types to which the greater number of chemical compounds may be referred; consequently a clear perception of the constitution and mutual relations of those four bodies is essential to a just comprehension of the principles of modern chemical classification and notation. The facts tabulated below have been determined by direct experiment, and are quite independent of theory.

Composition of Hydrochloric acid.

By weight.	36.5	Hydrochloric acid gas	=	1	Hydrogen	+	35·5 Chlorine
By volume.	[2 vols.]	,,	=	[1 vol]	,,	+	[1 vol.] ,,

Composition of Water.

By weight.	18	Water	=	2	Hydrogen	+	16 Oxygen
By volume.	[2 vols]	,, (as Steam)	=	[2 vols.]	,,	+	[1 vol.] ,,

Composition of Ammonia.

By weight.	17	Ammonia gas	=	3	Hydrogen	+	14 Nitrogen
By volume.	[2 vols]	,,	=	[3 vols.]	,,	+	[1 vol.],,

Composition of Marsh-gas.

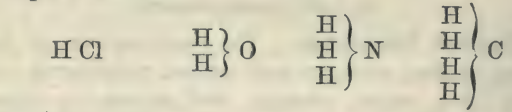
By weight.	16	Marsh-gas	=	4	Hydrogen	+	12 Carbon
By volume.	[2 vols.]	,,	=	[4 vols.]	,,	+	[——] ,,

These analytical results reveal a beautiful sequence of conditions. Equal bulks (2 volumes) of the four compound gases contain different proportions of hydrogen which, when liberated, measure respectively 1, 2, 3, and 4 volumes; and with each of these proportions of hydrogen is combined a proportion of another element which, when free and capable of existing in the gaseous state, measures 1 volume. Free carbon is not measurable as gas, but many considerations justify the introduction of marsh-gas into the series of typical hydrogen-compounds.

Representing the relative weights of equal volumes of hydrogen, chlorine, oxygen, and nitrogen, by the symbols H, Cl, O, N, and the relative weight of the non-gaseous carbon in marsh-gas by C, we may condense the preceding tables in the following simple expressions.

H Cl = 2 vols. Hydrochloric acid gas
H_2O = 2 vols. Water gas or Steam.
H_3N = 2 vols. Ammonia gas.
H_4C = 2 vols. Marsh-gas.

The differences between the four typical compounds become more obvious when the formulæ of water, ammonia, and marsh-gas are fully developed, thus:—



Hydrochloric acid. Water. Ammonia. Marsh-gas.

The relative weights of chlorine, oxygen, nitrogen, and carbon implied in the above symbolic expressions (Cl = 35·5, O = 16, N = 14, C = 12) are now generally accepted as the minimum relative combining weights of these elementary radicals, the weight of hydrogen being the unit (H = 1). By the Atomic Theory these relative weights are assigned to indivisible particles or atoms of different kinds of matter, and are therefore termed *atomic weights*. In accordance with this theory, the relations between weight and volume admit of easy interpretation by the assumption that equal volumes of the elementary gases H, Cl, O, N, contain equal numbers of atoms. The atomic conception of the constitution of our typical compounds may be thus expressed.

A *molecule* Hydrocholoric Acid = 1 *atom* Hydrogen + 1 *atom* Chlorine.
A *molecule* Water = 2 *atoms* Hydrogen + 1 *atom* Oxygen.
A *molecule* Ammonia = 3 *atoms* Hydrogen + 1 *atom* Nitrogen.
A *molecule* Marsh-gas = 4 *atoms* Hydrogen + 1 *atom* Carbon.

The term *molecule* is here employed to denote the smallest conceivable weight of a *compound* capable of existing by itself; but the term may also be applied to a proportionate weight of any elementary body. For example, the formulæ H Cl and Cl_2 represent comparable weights of hydrochloric acid and free chlorine, as they also indicate equal volumes, and in the language of the atomic theory the two atoms of chlorine constitute a molecule of the element. Certain considerations relating to the physical properties of gases and the laws of combination by volume, have led chemists to conclude that most of the elementary bodies, when in a free or uncombined state, have a molecular structure comparable to that of hydrochloric acid; in other words, that their atoms unite with one another in pairs. The application of this hypothesis to the four gaseous elements of our typical compounds is illustrated by the following table:—

Atoms.	Atomic weights.	Molecules.	Molecular weights.
H	1	H_2	2
Cl	35·5	Cl_2	71
O	16	O_2	32
N	14	N	28

Reverting to the symbolic formulæ of our typical compounds, we perceive that Cl, O, N, C, are combined respectively with H, H_2, H_3, H_4, and we may take the proportion of hydrogen in each typical molecule as the measure of the other element's ATOMICITY or combinning capacity. Thus chlorine is a *monatomic* element or equivalent to hydrogen in combining capacity; oxygen is *diatomic*, for its atom can combine with *twice* as great a weight of any given element as an atom of hydrogen, of chlorine, or of any other monatomic element; nitrogen is *triatomic*, its atom being capable of combining with *three* times as much as the standard atom of hydrogen; and carbon is *tetratomic* as its atom can combine with *four* times as much.* In symbolic expressions the atomicity of the elements may often be advantageously indicated by dashes or Roman numerals placed to the right of the symbols, thus:—

$$H\,Cl \qquad H_2\,O'' \qquad H_3\,N''' \qquad H_4\,C''''$$

The monatomic elements require no distinguishing mark. The following equations representing (in the simplest manner) the decom-

* Dr. Hoffmann, in his "Modern Chemistry," proposed the terms *univalent*, *bivalent*, *trivalent*, and *quadrivalent*, as substitutes for those we have given. The monatomic elements are frequently called *monads*, and the elements of higher atomicity, *diads*, *triads*, *tetrads*, etc.

position of water, ammonia, and marsh-gas, by chlorine, will help to elucidate the conception of atomicity :—

$$H_2O'' + Cl_2 = 2\,HCl + O''$$
$$H_3N''' + Cl_3 = 3\,HCl + N'''$$
$$H_4C'''' + Cl_4 = 4\,HCl + C''''$$

Looking at these equations we see that 2 atoms of monatomic chlorine are required to expel from the water-molecule its single atom of diatomic oxygen; 3 to remove from the ammonia molecule its atom of triatomic nitrogen; and 4 to attack the molecule of marsh-gas and displace its atom of tetratomic carbon. From these considerations the reader may infer that the combining proportions or atomic weights of the elements cannot with propriety be termed "equivalents," as they do not necessarily coincide with the weights of interchangeable or equivalent quantities. The weights represented by H and Cl are true equivalents, for they have the same substitutional value; but the weights represented by O, N, and C, are respectively equivalent to H_2, H_3, and H_4.

Bodies analogous in constitution, or comparable in their modes of transformation, are said to belong to the same TYPE, and the *primary types* now admitted are those of hydrochloric acid, water, ammonia, and marsh-gas. We have seen, however, that the differences between these four typical compounds may be ascribed to the atomicity of their constituents. The empirical classification of compounds according to types is therefore perfectly consistent with systems of classification that have been founded solely on the atomicity of the elements. Nearly all the chemical compounds of the Pharmacopœia may be conveniently referred to the primary types HCl H_2O, or to *multiple types*, such as H_2Cl_2, H_3Cl_3, H_4O_2, etc., representing combinations of two or more molecules of hydrochloric acid or water. A few simple illustrations of the association of bodies according to their molecular types are here given :—

Hydrochloric Acid Type.		*Water Type.*	
HCl	Hydrochloric acid.	H_2O''	Water.
$NaCl$	Common salt.	KHO''	Caustic potash.
KBr	Potassic bromide.	Ag_2O''	Oxide of silver.
KI	Potassic iodide.	H_2S''	Sulphuretted hydrogen.

Ammonia Type.		*Marsh-gas Type.*	
H_3N'''	Ammonia.	H_4C^{iv}	Marsh-gas.
HP'''	Phosphoretted hydrogen.	HCl_2C^{iv}	Chloroform.

For the typical representation of many compounds, certain groups of atoms, called *compound radicals*, must be taken as the equivalents of

simple portions of the models with which such compounds are compared. For example, hydrocyanic acid, H C N, may be regarded as hydrochloric acid, in which the chlorine has been displaced by the radical cyanogen C N. In like manner, alcohol, $C_2 H_6 O$, may be regarded as water in which one atom of hydrogen has been displaced by the radical ethyl $C_2 H_5$; and ether, as water in which both atoms have been so displaced, thus :—

$$\left.\begin{matrix} H \\ H \end{matrix}\right\} O \text{ Water.}$$

$$\left.\begin{matrix} C_2 H_5 \\ H \end{matrix}\right\} O \text{ Alcohol.}$$

$$\left.\begin{matrix} C_2 H_5 \\ C_2 H_5 \end{matrix}\right\} O \text{ Ether.}$$

The radicals cyanogen and ethyl are obviously monatomic, as they take the place of single atoms of hydrogen in the types H Cl and $H_2 O$; but the existence of compound polyatomic radicals equivalent to oxygen, nitrogen, and carbon, is also conceded.

The same compound may, in many cases, be referred to different types. Thus, trichloride of phosphorus, $P''' Cl_3$, may be supposed to be derived from the type $H_3 Cl_3$ (the triple molecule of hydrochloric acid), by the substitution of an atom of triatomic phosphorus for three atoms of hydrogen; or from the ammonia type $N''' H_3$, by the substitution of phosphorus for nitrogen and chlorine for hydrogen, atom for atom. The entire system of typical representation is, in fact, nothing more than a comparison of compounds with regard to their composition, by which particular analogies are revealed. That the several types are not classes of compounds distinctly separated from one another, will be evident if we apply the conception of compound radicals to the interpretation of the constitution of our four typical molecules, H Cl, $H_2 O$, $H_3 N$, and $H_4 C$. If we imagine one atom of hydrogen to be removed from each of these molecules, it is plain that the residues, Cl, H O, $H_2 N$, $H_3 N$, will each be able to combine with an atom of hydrogen to reproduce the original compound, or with an atom of another monatomic element. The residues H O, $H_2 N$, $H_3 C$, must accordingly be regarded as monatomic radicals comparable to Cl, in fact, they constitute the compound radicals which have been named hydroxyl, amidogen, and methyl. It follows, that our four typical compounds may fairly be referred to one type, and formulated thus :—

H Cl	Hydrochloric Acid	=	Hydrogen	+	Chlorine.
H (H O)	Water	=	Hydrogen	+	Hydroxyl.
H (H_2 N)	Ammonia	=	Hydrogen	+	Amidogen.
H (H_3 C)	Marsh-gas	=	Hydrogen	+	Methyl.

The reader should understand clearly that a *rational formula*, or an expression intended to convey an idea of the chemical nature of the compound to which it refers, merely recalls certain reactions in which the compound can take part, and that it may be modified to agree with other reactions. Thus, certain chemical relations are more clearly expressed by H (H O) than by H_2O, the formula usually adopted.

Modern Chemical Nomenclature. (M. Dumas.) "Now, would it not be desirable, in all points of view, to adopt a generic word, and to group around such word the names of species in proportion as science extends her conquests? I am particularly interested in organic chemistry, but I declare that time is entirely wanting to me to peruse, while comprehending them, the various memoirs on the science which come under my notice. The complication and insupportable length of the names are the sole causes of this."

Acetic Acid, Reduction of, to Alcohol. Acetic acid, a product of the oxidation of alcohol, has been lately reconverted into that body by Linnemann. On treating acetic anhydride with sodium amalgam, a violent reaction takes place, whereby, on account of the impossibility of excluding all moisture, that characteristic smell of aldehyde is developed. On addition of water, if an excess of amalgam remains, the smell of aldehyde at first becomes more apparent, and at last disappears. The solution, besides much acetate of soda, contains ethylic alcohol; at the same time, there is produced an aromatic oil, of difficult solubility in water.

1. $\left.\begin{matrix}C_2H_3\\C_2H_3\end{matrix}\right\}O - O = \left.\begin{matrix}C_2H_3O\\C_2H_3O\end{matrix}\right\}$ Acetyl.
2. $C_2H_3\ O + H = C_2H_4O$ Aldehyde.
3. $C_2H_4\ O + 2H = C_2H_6O$ Alcohol.

The above equations represent the successive processes of reduction which occur.—*Vierteljahresschr. f. prakt. Ph.*

Alkaloids, Aconite, Contribution to the Knowledge of. (*Archiv. der Pharmacie*, vol. 191, part iii.) Dr. F. A. Flückiger says:—According to Von Schroff, two substances are found in aconite root: one narcotic, the other acrid. Morson's aconitine represented the latter, the German aconitine the former.

The Himalayan aconites, known under the general term bikh or bish, furnished to Von Schroff an aconitine agreeing with that of Morson. He therefore concludes bikh (perhaps *A. ferox*) to have been used for the production of Morson's aconitine.

Wiggers, in 1858, gave to this the name napellin, but Hubschman had, in 1852, applied that term to an altogether

different substance, whose principal characteristics were insolubility in ether, inability to crystallize, non-precipitation of its salts by ammonia. He subsequently confounded it with an altogether different body, acolyctin, derived from *A. lycoctonum*.

Hubschman gave the name pseud-aconitin to the English article, and regarded it, when found in his aconitia, as an impurity. The characteristics he observed are these :—Difficulty of solution in ether, alcohol, and chloroform; crystallizing well from hot alcoholic solution; soluble in benzol; not altered by boiling water; not coloured by $S O_3 H O$; nor by $S O_3 H O + N O_5 H O$; tastes burning, not bitter; reaction alkaline. True aconitine, according to him, dissolves freely in alcohol. Ether and chloroform (4.2., 2.0, 2.6), softens in boiling water; acquires a yellow colour with $S O_3 H O$; tastes bitter, scarcely at all burning; reaction alkaline.

A specimen of true English aconitin (he does not say Morson's) sent to the author by Hubscham, who had received it from Merck, of Darmstadt, gave the following additional reactions:—Does not lose weight at 100°, crystallizes in prisms from hot alcohol, is not coloured by $\overline{P}$, nor by $\overline{S}$, nor by $\overline{S} + \overline{N}$. Notwithstanding all this, Hubschman regards pseud-aconitin as the same as narcotin!

Hubschman's aconitin (from *A. Nap.*) was also examined by the author with the following results :—Amorphous; loses nothing at 100°; fuses at 110–112° C.; treated with phosphoric acid, becomes violet-coloured, the tint lasting a whole day. Pseud-aconitin is, therefore, completely different from the Continental aconitin. Whether the Morson's pure aconitin, examined by Von Schroff, was or was not pseud-aconitin must remain undecided. Hubschman's suggestion that it is furnished by bikh root is, however, capable of being put to the proof.

Inquiries in England failed to elicit evidence of there being (known) more than one kind of aconitine, or that bikh was ever employed for its extraction.

Morson's aconitine, procured direct, gave the following reactions :—White, amorphous, containing 4·7 per cent. water; does not fuse at 100°, but softens in boiling water, melts to a clear yellowish liquid when heated on platinum foil over a spirit flame, and becomes a transparent, brittle mass on cooling; reaction violet with phosphoric acid, as well as Hubschman's; taste bitter, not acrid; is precipitated by K I, etc., but not by platino-chloride, corrosive sublimate, or red or yellow prussiate; dissolves freely in S. V. R., is precipitated by ammonia.

Morson's aconitin does not differ from the German aconitin.

An aconitin obtained from Hopkins & Williams gave very similar results. The taste, however, was not purely bitter, but acrid as well. The phosphoric reaction, moreover, gave a brownish instead of a pure violet colour.

Of the specimens, for which I have to thank the courtesy of T. B. Groves, the first, Morson's aconitin, 1860, reacts as above described; the second, Morson's aconitin, 1856, and two specimens of Mr. Groves' own preparation from *A. Nap.*, gave, with phosphoric acid, a dirty brown colour. Morson's were wholly amorphous. Groves' crystalline, especially the nitrate, the forms of which included various members of the rhombic system, particularly octohedra.

Von Schroff's statements are thus rendered still more difficult of explanation. We can only suggest that at different times different species of aconite were employed, and, consequently, different alkaloids obtained.

An astonishingly cheap aconitin, obtained from the London house, Roller & Wideman, and examined by Merck, gave the principal characteristics of pseud-aconitin—sparing solubility in alcohol and ether, crystallizability, infusibility in boiling water, etc.

An attempt to procure sufficient bikh roots for examination resulted in my acquiring only a trifling quantity derived from the museums of London and Kew. Subsequently I ascertained that 1000 lbs of Nepal aconite were being offered at 1*s.* 3*d.* per lb., but declined by manufacturers on the ground that there were plenty of Swiss roots obtainable. As, therefore, English manufacturers seem influenced in their choice of aconite roots solely by price, one is almost led to conclude that bikh roots (perhaps not all) do not differ from the aconite roots of our Alps. At any rate one is justified in accepting a modified idea respecting bikh roots. Could authentic specimens of the latter, whose botanical origin was known, be obtained, it would be worth while to investigate more closely the associated alkaloids it may contain.

The physiological effects of the various aconitins proved them identical. Pseud-aconitin, however, showed a difference. An extract of bikh showed the pure action of aconitin. It is to be hoped that Professor Klebs will elsewhere give us the details of his remarkable results.

The formula of aconitin arrived at by Von Planta is $C_{30}\ H_{47}\ N\ O_7$, which, when treated with dry H. Chl., would acquire an increase of weight equal to 6·8 per cent. Hubschman's aconitin, dried at 100° C., was increased by the same treatment 8·13 per cent., which

percentage was decreased to 6·07 per cent., by heating the combination to 110° C. Hopkins & Williams' alkaloid gave the same numerical results.

Von Planta, on the other hand, actually obtained 15·49 per cent., and, therefore, concluded the salt to be a bichloride.

That his results were wrong is proved by the muriate thus obtained yielding the compound, Acon. H Cy + P + Cy when treated with platino-cyanide of potassium.

A platino-cyanide prepared with Hopkins & Co.'s aconitin was pasty in consistence, and of a brownish colour, instead of being white and dense, as in the case of Hubschman's. These distinctive reactions of Hopkins & Williams' aconitin are, doubtless, due to that foreign body to which it owes its acridity—possibly pseud-aconitin, a body that may now be regarded as having a distinct identity, though its origin has not been clearly made out.

Pseud-aconitin and napellin are possibly identical. The former name is to be preferred as it has not yet been shown that *A. Napellus* is its only source, if, indeed, one at all. Of course pseud-aconitin has no similarity with narcotine, nor with aconellin, with which, doubtless, narcotine is identical.

The alkaloid lycoctonin, which Hubschman extracted from *A. lycoctonum* a yellow-flowered variety, common to the Alps and to the Himalayas, having until now only an uncertain position, it seemed desirable to ascertain its distinctive characters. It is accompanied in the root by acolyctin, which Hubschman has lately identified with napellin. The specimen examined was presented to the author by Hubschman, and was in a state of perfect purity. It was crystallized in perfectly white and distinct prisms and needles; reaction alkaline; melts at from 98° to 104°; does not volatilize with boiling water; cautiously melted, it remains colourless, and on cooling remains amorphous. The behaviour of this glassy substance with water, or the vapour of water, is most characteristic; in either case it starts at once into the crystalline state. This change is not brought about by mere friction with a knife, and is unattended with alteration of weight (narcotine behaves in a similar manner, but not so distinctly); is soluble in chloroform, bisulphide of carbon, S. V. R., oil of turpentine, amylic alcohol, almond oil, petroleum, ether. By rapid evaporation a varnish is produced which is affected by water in the same way as the fused akaloid; by slow evaporation crystal tufts are obtained; it is less soluble in water than is aconitin; its watery solution has an alkaline reaction, and tastes, like the base, distinctly bitter. Cor. sublimate, platino-

cyanide, platinum chloride, argento-cyanide, acid phosphate of molybdenum, iodide of potassium produce no precipitation; it is precipitated by tannin, bromide of mercury, cadmio-iodide, bismutho-iodide, iodine in iodide of potassium, bromine water, bromine in bromide of potassium, and especially by hydrargyro iodide. The precipitate from this last becomes crystalline after standing an hour; these crystals dissolve readily in S. V. R., and crystallize from the alcoholic solution very beautifully.

In solution $\frac{1}{500}$ this precipitant produces no immediate action, but after the lapse of a quarter of an hour beautiful crystals make their appearance. In solutions of $\frac{1}{1000}$ the same takes place after standing twelve hours. Hydrargyro-bromide does not immediately affect watery solutions of lycoctonin of any strength, but in a solution of $\frac{1}{100}$ crystals make their appearance after a day.

Watery solutions of aconitin, on the other hand, are precipitated by hydrargyro-bromide in the same manner as by hydrargyro-iodide, and the precipitates are equally uncrystallizable. Watery solutions of narcotin are not in any way affected by hydrargyro-iodide.

Lycoctonin furnishes similar crystals with bromine water and with cadmio-cyanide.

With bismutho-iodide a precipitate is formed in a solution of $\frac{1}{1000}$.

Sulphuric acid, nitric acid, chromic acid, concentrated phosphoric acid, alone or mixed, fail to produce colour reactions. Hubschman's contrary results were due probably to the use of a less pure specimen of lycoctonin. Solutions of the salts of lycoctonin are not precipitated by caustic or carbonated alkalies, yet the base itself is not soluble to any extent in caustic lye.

The sulphate crystallizes in prisms, the nitrate in tables.

Its physiological action differs both in kind and degree from that of the other aconite alkaloids. As a poison it is much less energetic than aconitin.

These results may be summed up as follows:—

1. Aconitin is found in the roots of the blue-flowered aconites, especially *A. napellus*.

2. It is also found in the Himalayan species, which go by the name of bikh, amongst which occurs *A. napellus*.

3. According to Hubschman, aconitin is wanting in *A. lycoctonum*—the yellow-flowered aconite.

4. Aconitin is characterised by the following properties:—It softens in boiling water, and imparts a violet tinge to phosphoric acid that has been concentrated by heating over a water bath at

from 80° to 100° C., that in the cold lasts for whole days. Its watery solution tastes bitter, not acrid. It is not precipitable by chloride of platinum. Soluble in 5 pts. S. V. R. (75 per cent.), also soluble in ether and chloroform. It fuses completely at about 120°. The nitrate crystallizes well, the free base not so distinctly. (T. B. G.)

5. The above description (par. 4) applies generally to English aconitin, except that occasionally an acrid taste accompanies the bitter.

6. Hence the term "English aconitin" is not distinctive.

7. There is found among the aconitins an entirely different basic body, of unknown origin. A conjecture may be hazarded that it is derived from the Indian bikh roots.

8. It is here referred to under the name of pseud-aconitin. Its discoverer, Von Schroff, however, called it English aconitin; other chemists have called it English aconitin, napellin, nepalin, acraconitin.

9. Pseud-aconitin does not soften in boiling water; does not give the violet colour with phosphoric acid; tastes acrid, not bitter; does not dissolve in water, is little soluble in ether, chloroform, and S. V. R. in the cold; crystallizes readily in large prisms from boiling saturated solutions in the above.

10. Napellin is an alkaloid distinct from the above alkaloids.

11. Lycoctonin is likewise a distinct alkaloid, and is exceedingly well characterised by the behaviour of its watery solution with bromine water and iodo-hydrargyrate.

Equally striking is the quickness with which cautiously melted lycoctonin after completely cooling becomes reconverted, by moistening with water, into crystals.

Although I have not succeeded with regard to pseud-aconitin in discovering the whole truth, yet I hope, through what I now offer, to have pointed out the right path which, sooner or later, must lead to more satisfactory knowledge.

Æniline, the Colouring Matter of Wine. M. Moral gives the name æniline to the colouring matter met with in genuine red wines obtained from grapes. It is obtainable by heating the wine by a very complicated process; when ultimately the colouring matter is precipitated as a red flocculent substance insoluble in ether, very difficultly soluble in water, soluble in alcohol, and insoluble in benzol.—*Quarterly Journal of Science*, Oct., 1869.

Albumen Soluble. (*Bull Soc. Pharm.*, 1870.) By Monnier. The author dried albumen in the sun and by artificial heat. He found

that it had preserved its solubility in water, but that it was no longer coagulated by heat. The experiments were repeated again and again with always the same result. This peculiar condition was described in 1854 as a third modification of albumen. Since that the author has succeeded in restoring to such modified albumen its tendency to coagulation. Very dilute solutions of acetic, formic, citric, and tartaric acids do not thicken it, but render it again capable of clotting when heated.

For instance, 0·2 grammes of modified albumen dissolved in 10 c. c. water, treated with 0·005 grammes of acetic acid in 50 c. c. water, completely coagulate on heating. Solutions of tartaric and citric acids must be used more concentrated. The quantity of acid is always proportional to the albumen, so it is not a contact action like that of platinum black on spirit. From a number of experiments, the author concluded that uncoagulable albumen played the part of a weak base combined with an acid, and coagulation was the property of every such combination of albumen; acid united with natural albumen he considers as not yet known, but in the second case it was acetic acid.

Ammonia.—Bohlig's Test for Ammonia. This reagent, which is more convenient than the Nessler test, consists merely of a solution of corrosive sublimate; it is equally applicable for determining either free or combined ammonia. If to 50 cubic centimetres of water a few drops of mercuric chloride solution (containing 1 part of the salt to 30 of water) be added, the presence of $\frac{1}{100000}$ of ammonia causes a white turbidity after a few minutes. In testing ammonia salts, 2 or three drops of carbonate of potash solution (1 part of the salt to 5 of water) are added to set free the ammonia.

Aniline-Coloured Syrups. Vandevyverl, of Brussels, notices the danger of using syrups and liqueurs tinted with aniline colours. These articles, coloured with magenta or *rubine imperiale* are, for the most part, solutions of glucose acidified with tartaric or citric acid, and flavoured with a few drops of the compounds, ether, or aldehydes, sold under the name of strawberry or currant essence. Vandevyverl recognised as much as 5 centigrammes (more than $\frac{7.7}{1000}$ grain) in 200 grammes (a little over 7 ounces) of syrup, a quantity, which, considering the frequent occurrence of arsenic acid in aniline colours, must be looked upon as dangerous, and requiring the prohibition of the sale of such commodities. The means of identifying them are the following:—Mineral acids brighten the red tint of the real syrups, while they turn aniline colours or a yellow orange. Caustic alkalies give a dirty green colouration

with real syrups, while they decolourise those tinted with aniline dyes. Carbonate of potash is without action on the colour of artificial syrups, while the genuine ones become green. Subacetate of lead gives a green precipitate with genuine, and a red with magenta-coloured syrups; the latter also produce a blue with aldehyde.

Tartar Emetic, the Preparation of. (Chr. Rump.) In order to obtain tartar emetic free from arsenic, a most important consideration, 1 part of finely-prepared sulphide of antimony and 4½ parts of hydrochloric acid which contains 1½ per cent. of nitric acid of 1·3 sp. gr., are gradually heated together with agitation until a boiling temperature is reached, by which some sulphur is separated, and a portion of the antimony remains undissolved. The warm solution is poured off from the deposit, which is washed with hydrochloric acid on a small filter. After cooling, or even prolonged standing, sulphur and a little lead as chloride separates: the solution is then poured into water sufficient to precipitate all the antimony; the precipitate is washed either by decantation or filtration on a cloth, till the washings give little or no acid reaction. The precipitate is then placed in a basin to be dissolved.

In order to neutralise the small quantity of hydrochloric acid, neutral tartrate of potash is added till the acid reaction ceases, whereby common salt and tartar emetic are produced. The process is then simply as follows:—A portion of the precipitated magnesia is warmed, and cream of tartar is added till solution is effected of the whole mass, except a small quantity of sulphide of antimony. The oxide is then again added in excess, and about half as much neutral tartrate of potash as the cream of tartar used. There is thus again produced bitartrate of potash, which again dissolves more oxide of antimony. So the process goes on till an excess of antimonic oxide remains; nothing is left to be done then but filtration, evaporation, and crystallization.

Tartar Emetic, the testing of, for Arsenic. (W. Stromeyer.) The author justly lays stress on the uncertainty of the test for arsenic in tartar emetic, which depends on the smell emitted on charring. He recommends the following methods:—2 gms. of tartar emetic are dissolved in 115 gms. of pure hydrochloric acid of 1·124 sp. gr., and extracted with sulphuretted hydrogen; only sulphide of arsenic is precipitated. It is all the better if the solution be warm; it is also advisable to moisten the gas-delivery tube with acid before dipping into the liquid in order to avoid a slight precipitate of sulphide of antimony which might occur.

Tartar Emetic Compounds with Nitrates. (J. F. Martenson.)

Tartrate of potash and antimony dissolves readily in a solution of a nitrate, giving by evaporation a double salt. In general these combinations are well crystallized; colourless if the nitrate be not coloured; easily soluble in water, and slightly deliquescent. At 200° C. they lose all their water of crystallization, and at 300° C. deflagrate, often briskly, leaving behind a spongy pyrophoric residue. Alkalis and strong acids separate antimonic oxide, soluble in excess of the acid. Many of the compounds crystallize with difficulty out of a syrupy solution; but if to this strong alcohol be added well-formed crystals are deposited after a time. The author did not succeed in combining nitrate of potash with tartar emetic.

Apocodœia (Hydrochlorate). (Matthiessen and Burnside.) Apomorphia having been obtained by heating morphia with chloride of zinc, successful efforts were made to extract apocodœia, that is, codeia minus the elements of water, in a similar manner. Hydrochlorate of codeia, heated with excess of concentrated solution of chloride of zinc to a temperature between 170° and 180° C. for about fifteen minutes, is decomposed; on cooling, a yellowish-brown tarry mass separates from the liquid, which, on further cooling, may be drawn into thin threads, almost free from excess of chloride of zinc. This is hydrochlorate of apocodeia.

To obtain the pure base, this was dissolved in hot water, and precipitated by hydrochloric acid; the solidified precipitate was separated from the cold acid solution. The hydrochlorate having been several times dissolved and reprecipitated, was dissolved in water, precipitated with carbonate of sodium, and the base extracted with ether. When dried it formed an amorphous, gum-like, reddish mass. It is soluble in alcohol, ether, and chloroform, and has not yet been obtained in a crystalline state. It differs somewhat from apomorphia in the following respects:—The blood-red colour given with nitric acid is more permanent; the base is far more stable than apomorphia; the hydrochlorate of apomorphia is crystallizable, that of apocodeia is not; the yield of the first is uncertain, of the second large. As regards the physiological effects of the two hydrochlorates, that of apomorphia, according to Dr. Gee, is a violent emetic, whilst that of apocodeia is mild in its action.

Apomorphia (a new base), the joint discovery of the late Professor Matthiessen and Mr. Wright, is thus described:—When morphia is sealed up with a large excess of hydrochloric acid, and heated to 140°–150° for two or three hours, on opening the tubes after cooling, no gas is found to have been formed, nor is there any formation of chloride of methyl. The residue in the tube contains the hydro-

chlorate of a new base, differing considerably in its properties from morphia. It may be obtained in a state of purity by dissolving the contents of the tube in water, adding excess of bicarbonate of sodium, and extracting the precipitate with ether or chloroform, in both of which the new base is readily soluble, whilst morphia is almost insoluble in both menstrua. On shaking up the ethereal or chloroform solution with a very small quantity of strong hydrochloric acid, the sides of the vessel become covered with crystals of the hydrochlorate of the new base. These may be drained from the mother liquors, washed with a little cold water, in which the salt is sparingly soluble, and re-crystallized from hot water and dried on bibulous paper or over sulphuric acid.

This hydrochlorate contains no water of crystallization. After drying in the water-bath, it yielded results on combustion with chromate of lead and oxygen agreeing with the formula $C_{17}\,H_{17}\,N\,O_2\,H\,Cl$.

From a solution of the hydrochlorate in water, bicarbonate of sodium precipitates as now-white non-crystalline mass, which speedily turns green on the surface by exposure to air, and is therefore difficult to obtain dry in a state of purity. This precipitate is the base itself.

It hence appears that the new base is simply formed from morphia by the abstraction of the elements of water.

$$\underset{\textit{Morphia.}}{C_{17}\,H_{19}\,NO_3} = H_2\,O + \underset{\textit{New base.}}{C_{17}\,H_{17}\,NO_2}.$$

We propose to call the new base apomorphia, for reasons given subsequently.

When the hydrochlorate of apomorphia in a moist state is exposed to the air for some time, or if the dry salt is heated, it turns green, probably from oxidation, as the change of colour is accompanied by an increase of weight. The base itself, newly precipitated, is white, but it speedily turns green on exposure to air. The green mass is partly soluble in water, communicating to it a fine emerald colour,—in alcohol yielding also a green tint, in ether giving a magnificent rose-purple, and in chloroform with a fine violet tint.

The physiological effects of apomorphia are very different from those of morphia; a very small dose produces speedy vomiting and considerable depression, but this soon passes off, leaving no after ill-effects,—facts of which we have repeatedly had disagreeable proof while working with it.

Dr. Gee is now studying these effects, and has found that $\frac{1}{10}$th of a grain of the hydrochlorate subcutaneously injected, or $\frac{1}{4}$ grain

taken by the mouth, produces vomiting in from four to ten minutes. Our friend Mr. Prus allowed himself to be injected with $\frac{1}{10}$th grain, which produced vomiting in less than ten minutes. From Dr. Gee's experiments on himself and others, he concludes that the hydrochlorate is a non-irritant emetic and powerful anti-stimulant. As from these properties it appears probable that it may come into use in medicine, we have called it apomorphia, rather than morphinine, to avoid any possible mistakes in writing prescriptions.

Bebeeru Alkaloids. Bases from the Wood of the Greenheart-tree. Dr. Douglas Maclagan and Dr. Arthur Gamgee, in a communication to the Pharmaceutical Society, Edinburgh (*Pharm. Journ.* [2], vol. xi., p. 19), give the results of their examination of the alkaloids contained in the wood of the bebeeru or greenheart-tree (*Nectandra Rodiœi*, Schomburgh). When the wood is subjected to a process similar to that prescribed in the British Pharmacopœia for the preparation of "sulphate of beberia" from the bark of the tree, a mixture of the sulphates of several bases is obtained. The product does not differ in a marked manner from sulphate of beberia (bebeerine sulphate) as it occurs in commerce. From the mixture of bases, the authors separated, by repeated treatment with chloroform, a base which is very soluble in that menstruum. This base when purified, occurs in the form of a white non-crystalline powder, having an intensely bitter taste. It differs from bebeerine in the following particulars:—1. It fuses when placed in boiling water. 2. It is much less soluble in ether than bebeerine. 100 parts of pure ether, sp. gr. 0·715, dissolve 0·96 part of bebeerine. 100 parts of the same ether dissolve 0·04 part of the new base. 3. When treated with strong sulphuric acid and manganese dioxide, it gives a magnificent green colour which slowly passes into a beautiful violet, not unlike that produced by the action of the same reagents on strychnine. 4. The new base has a higher molecular weight than bebeerine. The mean of four ultimate analyses gave numbers consistent with the formula $C_{20}\ H_{23}\ O_4\ N$, while the formula of bebeerine, as ascertained by Von Planta, is $C_{18}\ H_{21}\ O_3\ N$. The authors have named the new alkaloid, nectandria. After separating nectandria from the mixed bases of the wood, the authors succeeded in obtaining a base which is much more soluble in hot and cold water, and insoluble in chloroform. It is deposited from a boiling solution in the form of yellow nodules. Its taste is at once bitter and astringent, and it appears to have a lower molecular weight than bebeerine. The authors have ascertained the existence of a third base, the characters of which have not yet been carefully determined.

Bromine Salts. Prof. Bœdeker's Process for the Preparation of. By August Faust.

Bromide of sulphur is prepared by mixing in a flask 20 parts of flowers of sulphur, with 240 parts of bromine. The bromide of sulphur is poured into thick milk of lime, consisting of 240 parts of the caustic earth (obtained by calcining white marble), treated with sufficient water. The result on warming is bromide of calcium, and sulphate of lime. The supernatant colourless liquid is filtered, and the residue on the filter well washed. The filtrate to separate the dissolved lime, is treated with carbonic acid. Boil, filter from the precipitated chalk, and evaporate to a small bulk, mix with twice the volume of spirit, and allow to stand a few days; sulphate of lime separates; filter, and evaporate to dryness; the residue is pure bromide of calcium. In the preparation of bromide of barium, the treatment with alcohol is omitted. The so-obtained bromide of calcium, or barium, forms the basis for the preparation of the alkaline bromides,—for instance, the treatment of the aqueous solution with carbonate of ammonium, to which has been added a little sal-ammoniac, boiling, filtering, evaporation to dryness, re-dissolving in water, filtering and crystallizing yields bromide of ammonium. It is necessary to get rid of all carbonate of ammonia by evaporation, otherwise traces of baryta or lime would remain in solution. By cautious precipitation of bromide of calcium, or barium solutions with carbonate of potash, the corresponding alkaline bromide may be prepared.

Bryonicine. (*D. Chem. Tech. Mittheil.*) M.M. L. de Koniuck and P. Marquart find that the root of the bryony (*Bryonia dioica*, L.) contains a third perfectly distinct and well-defined substance, in addition to the two already known, bryonine and bryontine. This they have called bryonicine, giving it the formula $C_{10}H_7NO_2$, and have confirmed this composition by an analysis of the bromine substitution compound, monobromide of bryonicine (*bryonicine monobromé*), which is formed under the influence of liquid or gaseous bromine. Bryonicine is a solid substance, crystallizing in slightly flattened crystals, fusible, and volatile without change; although containing 8 per cent of nitrogen, it has none of the chemical properties of the alkaloids; its chemical nature, and the position it ought to occupy are not yet fully determined. It is neutral to test papers, insoluble in cold water, potash, ammonia, and dilute mineral acids; water and hydrochloric acid dissolve a small quantity at the boiling temperature; alcohol, ether, chloroform, sulphide of carbon, glacial acetic acid and concentrated sulphuric acid, dissolve it with the greatest facility; in the

latter case the solution has a blood-red colour. It melts at 56° C., and at a higher temperature distils without decomposition. Its relation towards acids and alkalies appear to place it among the glucosides.—*Bulletin de l'Académie Royale des Sciences de Belgique*, 1870, No. 3.

Butyric Acid in Glycerine. (*Journ. de Pharm. et de Chim.*, vol. xi., p. 141.) M. Peyrutz says, that in order to discover the presence of butyric acid in glycerine it is sufficient to heat this substance with a little alcohol and concentrated sulphuric acid. If any butyric acid be present, the peculiar odour of pineapple will be observed, produced by the formation of butyrate of ethyl.

Cantharidine and Cantharidate of Potassium.—Cantharidate of Potassium Vesicatives. (*Bull. de Therap.*, Jan., 1870.) M.M. Delpech et Guichard in the course of their investigations on cantharidine, having found in a German journal the following note by Messrs. Massing and Draggendorf, on the combinations of cantharidine, and assuming that it is little known to foreigners, think it advisable to give a *résumé*.

They write as follows:—These gentlemen, Messrs. Massing and Draggendorf, consider cantharidine $C_{10}H_6O_4$ as an anhydric, which when combining with basis, retains two equivalents of water, and which yields salts of cantharidic acid $C_{10}H_6O_4\ 2HO$. This acid does not exist in a free state, but its combinations with all the metals is described. We shall speak only of cantharidates of potassium, of soda, and of ammonia, which are soluble in water, and the cantharidates of the usual metals which are insoluble. These last are obtained by double decomposition; they have no interest for us at present. Cantharidic acid is diatomic, but yet it combines with only a single equivalent of base, except in cantharidate of cadmium where it is really diatomic. Solutions of alkaline cantharidates, treated with acetic acid precipitate, not cantharidic acid, but cantharidine, which is its anhydride. This cantharidine is more volatile and soluble than ordinary cantharidine, no doubt on account of its more feeble cohesion. The alkaline cantharidates have a very powerful vesicant action. A few lumps of cantharidate of potassium placed upon the arm, produce vesication in a rapid manner. A piece of filtering paper dipped into a cold aqueous solution of cantharidate of potassium, after being dried in the air produces a perfectly clean vesication. At the end of a fortnight this paper had preserved all its efficacious properties. This result could be easily foreseen, for the cantharidate of potassium is perfectly fixed and stable.

It is as vesicant as cantharidine. Three vesicatives were applied simultaneously, one dry, one moistened with weak acetic acid or vinegar, the third with water. The first acted in seven hours, the second, which was cantharidine, and the third which was cantharidate of potassium, both acted in five hours. The cantharidates are prepared by the direct action of the alkali in the presence of water. The combination is made under the influence of heat. The solution is evaporated and the cantharidate crystallizes. The alkaline cantharidates appear in the form of very small scales or crystalline crusts. Cantharidate of ammonia is not stable; it loses its ammonia at 100°; it is acid to litmus paper. Cantharidate of potassium is, on the contrary very stable, it has an alkaline reaction. The same with cantharidate of soda.

We have found another method of preparing cantharidate of potassium:—Dissolve 2 grammes of cantharidine in 150 grammes of alcohol at a gentle heat; add to it 1·60 grammes of caustic potash dissolved in a very little distilled water, the liquid immediately congeals into a mass; the alcohol is separated by pressure and filtration. The composition of cantharidate of potassium is—

$$C_{10}H_6O_4KOH+HO.$$

98 parts of cantharidine give 163 parts of cantharidine of potassium.

Boiling water dissolves	8·87 per cent.
Cold water	4·13 ,,
Boiling alcohol	0·93 ,,
Cold alcohol	0·03 ,,

It is on the insolubility, indicated by the German authors, that our method of preparation was founded. Cantharidate of potassium is equally insoluble in ether and chloroform. Thus we have an active and stable vesicant; all we had to do was to dissolve it in a suitable liquid and spread it upon an appropriate tissue.

After numerous trials we stopped at the considerably modified formula which is used for the preparation of the English sticking plaster.

℞ Gelatine	2 grammes
Water	10 grammes
Alcohol	10 grammes
Cantharidate of potas.	20 centigrammes
Glycerine	q.s.

We spread this liquid smoothly with a brush on thin sheets of

gutta-percha, in such a way that each square decimetre contains one centigramme of cantharidate of potassium. We have adopted the use of gutta-percha, first, because of its flexibility and elasticity; secondly, on account of its impenetrability, which keeps all the active principle on its surface and so augments the rapidity of its therapeutic action; and lastly, on account of its cleanliness and neatness.

The vesicants thus prepared of all sizes, with which we have made numerous experiments, leave no doubt of their efficacy. We can, besides, at will modify the rapidity of their action with mathematical precision, by diminishing or augmenting the quantity of cantharidate.

The vesicants ought to be slightly moistened with water before their application; in this way vesication is produced in about six hours. We have prepared several, which, containing double the quantity of cantharidate, acted in four hours.

Cantharidine Plaster.—Plaster with the base cantharidine. (*Journ. de Pharm. et de Chim.*, vol. xi., p. 233.) M. Lissonde, in a work which he has lately published on cantharidine, gives the following method of obtaining that substance:—

Take 50 grammes of the soft part (abdomen) of the insect; reduce it to a coarse powder by means of a covered mill; this powder is put into a glass tube, furnished with a tap, and left for twelve hours in contact with about its volume of chloroform. Then opening the tap, the operator displaces by a fresh quantity of solvent, and the united liquids are distilled in the water bath, in a little glass retort, until the mixture is of the consistency of soft extract; this being treated with carbon sulphide and thrown on a filter, yields cantharidine in a state of sufficient purity for its weight to be determined. This weight is in the proportion of 4·60 grammes per kilogr.

M. Lissonde has often seen a chloroformic solution of cantharidine at 30° used to obtain a rapid vesication at the Hôpital du Midi, but he says that nothing can surpass the plaster prepared according to the following formula:—

℞	White wax	45 grammes.
	Olive oil	28 ,,
	Turpentine	24 ,,
	Camphor	1 ,,
	Cantharidine	2 ,,

Melt the wax in the oil with gentle heat, add the three last substances; stir, and let it cool an instant, then pour out the mass, or spread it on cloth prepared for that purpose.

On being applied to the skin, it perfectly raises the epidermis in a

few hours, and shows all the characteristics of a good vesicant. It keeps without change, and its activity and rapidity of action ought to bring it into general use.

Chloral-hydrate. English and foreign journals are crowded with reference to this substance, and its mode of manufacture and reaction are elaborately described both here and on the continent. A few of these notices are either given in abstract or translated. The remarks of Dr. Richardson and the late Sir James Simpson will be read with interest.

Chloral-hydrate, the Preparation of. (Müller and Paul.) (*Bull. Soc. Pharm.*, 1870.) A rapid stream of chlorine is passed through absolute alcohol. The more rapidly the gas passes the less chloride of ethyl and water is formed, and accordingly the greater is the yield of chloral hydrate. At the commencement it is necessary to keep the temperature below 30° C.; as the operation proceeds and the gas is absorbed with greater difficulty, heat is applied, till towards the end of the process a temperature of 100° C. is reached. Six days are occupied in saturating 250 grms. of alcohol; by this time it has become a solid crystalline mass of double its original weight. It is heated out of contact with aqueous vapour on the water bath, poured into another dry flask, melted, and allowed to solidify twice more. On the last occasion it is poured into a retort and distilled. It is found in the receiver as a white dry crystalline mass. Much chlorine escapes as the process draws to an end; this may be utilised by passing it into fresh alcohol.

The chlorine mixture should not be heated above 50° C., and to obtain an uninterrupted current, another flask of the mixture should be ready as soon as one is exhausted.—*Berichte der Deutsch. Chem. Gesellschaft.*

Chloral-hydrate. (*Hager's Centralhalle.*) In order to obtain a pure hydrate of chloral, the best method seems to be the preparation of the chloral and subsequent hydration. Chloral-hydrate of varying consistency is met with: one soft and easy to crumble, the other solid. The cause of these appearances is the degree of hydration. The softer hydrate is saturated with and usually contains an excess of water; the more solid, on the other hand, contains a trifling quantity of free chloral. The latter state has unquestionably certain advantages in its preservation and dispensing, as the trace of free chloral in contact with moisture immediately becomes chloral-hydrate.

Chloral-hydrate, Reaction of. (*Hager's Centralhalle.*) The characteristics and reactions of a good and pure specimen of chloral-

hydrate are, besides colourlessness, its smell, taste, and neutral behaviour, the following :—

1. Solubility in 1·5 parts of pure water at the ordinary temperature.

2. Easy solubility in spirit.

3. About 2 decigrammes (3 grains) heated in a silver spoon over the spirit lamp, melts without combustion, even if when boiling it is brought near to the flame. It leaves no residue.

4. The aqueous solution (1 to 5 or 10 parts of water) in a test tube, on addition of a few drops of ammonia and nitrate of silver solution, shows a reduction; and on warming, yields a very beautiful metallic silver mirror.

5. The aqueous solution gives no turbidity with silver nitrate; on heating, reduction takes place, without production of a mirror.

6. The solution is without action on permanganate of potash even on warming.

7. Concentrated pure sulphuric acid. Chloral-hydrate thrown on the surface of this acid swims, and liquefies only slowly; on shaking, the acid remains colourless, but becomes turbid through the distribution through it of chloral-hydrate in minute drops. Application of heat volatilizes the chloral-hydrate, which crystallizes on the cool part of the tube without browning the acid.

8. Heated with nitric acid of 25 per cent strength, no reaction.

9. Caustic potash of 1·3 sp. gr. If about 2 decigrammes (3 grains) o chloral-hydrate be thrown on to caustic alkali solution, it dissolves with a short and rapid evolution of gas,* while drops of chloroform settle to the bottom of the liquid. A sensible amount of heat is disengaged.

Chloral, as exhibited at Exeter. Specimen of hydrate of chloral was received from Berlin, where it has been introduced as a remedial agent by Dr. Oscar Liebreich. Chloral in an anhydrous state is a heavy, volatile, colourless liquid produced by the action of chlorine upon alcohol, and having the composition C_2Cl_3OH. If this body is brought into contact with a small proportion of water, the two combine, and a solid crystalline hydrate is the result. This substance is extremely soluble in water, affording when pure a neutral solution which is unacted on by nitrate of silver or by acids, but which is immediately decomposed by a caustic alkali, chloroform being set free. This property suggested to Liebreich the idea of

* The evolved gas is not carbonic acid arising from the presence of carbonate in the alkali solution. Theory strictly requires the formation of formic acid and chloroform, so that the gas may be due to a hitherto overlooked reaction, or it may not be liberated perhaps from an absolutely pure chloral-hydrate.

employing it therapeutically. He conceived that if it were brought into contact with the blood, chloroform would be evolved in a gradual manner, and anæsthesia, less transient than that obtained by inhalation of chloroform, would be produced.

It was, in fact, found by experiment that hydrate of chloral administered to rabbits produced profound sleep, and similar results followed its administration to human beings. The first case in which man was the subject, was that of a lunatic to whom a dose of 1·35 grammes of the hydrate was injected subcutaneously, the effect produced being a sleep of five hours' duration. An internal dose of 3·5 grammes given in a wineglassful of water, was followed by sleep which lasted for the rather alarming period of sixteen hours. The ordinary dose recommended by Dr. Liebreich, as an hypnotic, is 2·5 grammes, about 38 grains.

Dr. Liebreich has succeeded in obtaining a form of chloral-hydrate in transparent crystals, somewhat of the average size of fine Epsom salt crystals: this is the best form for the regulation of the exact dose.

Chloral-alcoholate, Chloral-hydrate. Chloral-alcoholate, a substance of only theoretical interest ($C_2HCl_3O.C_2H_5O$) forms white transparent, hygroscopic needles, has much the same smell and taste as chloral-hydrate, but dissolves less easily in water. Heat chloral-alcoholate in a test-tube with twice its volume of water, it melts without dissolving, and solidifies on cooling beneath the water, in a crystalline form, whereas chloral-hydrate dissolves in water without melting. Chloral-alcoholate heated with sulphuric acid browns, whilst chloral separates; no colouration ensues when chloral-hydrate is treated in like manner. Lastly, if chloral-alcoholate be treated with nitric acid of 1·2 sp. gr., and warmed, a violent reaction ensues, with disengagement of nitrous acid, chloral-hydrate gives a scarcely, if at all, observable evolution of yellow vapours. The application of these tests is quite necessary, as the substitution of one for the other may easily occur from their similarity in appearance, smell, and taste, whilst they are both formed by the same process of manufacture.

Considering that spirit of wine has five times the atomic weight of water, there is every inducement for manufacturers to substitute chloral-alcoholate for chloral-hydrate.

Chloral, on the Recent Investigation of. By Dr. Arthur Gamgee, F.R.S.E., Lecturer on Physiology, at Surgeon's Hall, and Physician to the Edinburgh Royal Hospital for Sick Children.

Relations of Chloral to other Bodies.—The formula of alcohol is,

C_2H_6O. This body, when treated with certain oxidizing agents, yields a substance called aldehyde, a colourless liquid of suffocating smell, miscible in all proportions with water, and well known for its power of reducing solutions of nitrate of silver. This body has the formula $\left.\begin{matrix} C_2H_3O \\ H \end{matrix}\right\}$

By acting for a long time (about seventy hours) upon alcohol, by means of chlorine, we obtain a body which appears to differ from it in having hydrogen replaced by Cl, having therefore the chemical formula C_2HCl_3O, and represented by the formula $\left.\begin{matrix} C_2Cl_3O \\ H \end{matrix}\right\}$

Properties of Chloral.—This body exists in a liquid condition, possessing a powerfully pungent odour. Its specific gravity is 1500, and its boiling-point is very nearly the same as that of water, being 99° C., or 210° F. Chloral has a great tendency to combine with water, and forms a white crystalline solid body—the hydrate of chloral, which I have to bring under your notice. This hydrate is very soluble in water. It is volatilized by heat, and may be purified in this manner.

Decomposition with Alkalies.—It has long been known that when treated with caustic alkalies chloroform is developed, and at the same time there is formed a formiate of the alkali.

This decomposition is interesting, as a knowledge of it led Liebreich to speculate that chloral might be a valuable remedy. The blood, being an alkaline fluid, was, he supposed, likely to effect the decomposition of chloral, and to cause a gradual evolution of chloroform throughout the economy. To a certant extent facts appeared to countenance the hypothesis, for chloral was found to produce, when introduced into the system of animals, a more or less deep sleep lasting for hours, which, unless the dose had been excessive, passed off without leaving any serious symptoms.

Chloral, Use of. (Bence Jones.) "I have in no case used more than 60 grains of chloral for one dose. Dr. Liebreich states that 200 grains may be given for one dose. I have never used it as an injection beneath the skin. He has used it in 7 grain doses frequently. He tells me he has given it every night for three months without any loss of its property of causing sleep. I have only given it for a few nights consecutively. The largest quantity I have given in the shortest time has been 150 grains in six hours, for the most intense neuralgic pain with violent gout in the foot.

"The rapidity of action of the hydrate of chloral, is very great when the stomach is quite empty. It is very different when the medicine

has to wait for the solution of the food. Probably it acts much more rapidly when given in sugar and water than in mucilage of gum." Bence Jones suggests that variations in preparation may materially influence therapeutical results.

Chloral, Therapeutic Note on. (Sir J. Y. Simpson.) The dose of chloral to an adult for an hypnotic which I have usually employed has varied from 50 to 60 grains; but 25 to 30 grains suffice in some patients. In a case of long-standing sleeplessness, and which had resisted great doses of opium, Indian hemp, etc., 120 grains failed to produce any effect. When used for anodyne and other medicinal purposes, a combination of smaller doses, as 10 or 20 grains several times a day is sufficient.

In administering chloral, I have given it only by the mouth and by enema, almost always as a draught. It is somewhat acrid and pungent to most palates, and hence requires to be diluted well with water, and to have added to it a large quantity of syrup.

When it first came into use in this country, the charge for a dose containing 1 drachm or 60 grains of chloral, was as high as 3*s.* 6*d.*, an almost prohibitory price. A draught containing the same quantity is now sold by our druggists at Edinburgh for 6*d.*; and doubtless it will become much cheaper when it becomes more employed. [We sincerely hope not.]

Chloral, Hydrate of, Physiological Action of. Richardson. (Summary.) The effects of hydrate of chloral may be summed up as follows:—

1. Deep and prolonged narcotism can be safely produced by the hydrate of chloral.

2. During a portion of the period of narcotism, there may be complete anæsthesia with absence of reflex actions, and a condition in which every kind of operation fails to call forth consciousness.

3. During the narcotism there are intervals of apparent exalted sensibility.

4. In the transition from drowsiness to stupor, there is no stage of muscular excitement, but in birds there is vomiting, as is common in the same animal in the second stage of narcotism under chloroform.

5. During the narcotism produced by the substance, there is invariably reduction of temperature.

6. The hydrate produces muscular relaxation, which relaxation extends to the muscles of volition, and alike to the iris and the muscular-arterial system. From the condition of the muscles after death, we may infer that this paralysis is in part due to change within the muscular structure itself.

7. The action of the substance on the nervous system is primarily on the sympathetic ganglia, afterwards on the cerebrum, and finally on the heart.

8. Recovery, when it takes place, is followed by no bad results.

9. In fatal cases, the functions destroyed are: (i.) the cerebral; (ii.) the voluntary muscular; (iii.) the respiratory; (iv.) the heart.

10. The substance in small proportions arrests, in some degree, the coagulation of the blood, and in large quantities, stops the process of coagulation altogether. In large quantities it also destroys the blood corpuscles, and produces general destruction of blood; but the dose required to produce extreme narcotism, need not be so large as to lead to serious derangement of blood.

11. The phenomena observed, correspond with those observed under chloroform, and the balance of evidence is that they are the result of the action of chloroform.

Chloral Perlé. (Limousin.) M. Limousin exhibits chloral hydrate in capsules of hard gelatine; each contains 33 centigrammes of *crystallized* chloral-hydrate. The advantages claimed are:—certain dose, more certain therapeutic effect in the solid than in the fluid state, and perfect purity, for unless the hydrate were entirely free from acid, the gelatine would be attacked.

Chloral-hydrate, Formulæ for the Use of. (*Union Pharm.*) *Syrup of chloral-hydrate*:—

℞	Chloral-hydrate	10 grammes
	Distilled water	10 grammes
	Simple syrup	980 grammes.

The chloral is dissolved in the water, and the solution mixed with the syrup.

This syrup possesses a sweet, agreeable taste, and an odour which is at the same time like that of chloral and that of chloroform. The chloroform odour is especially noticeable when the cork is taken out of a bottle which has been closed up for some time. The decomposition of the chloral is only partial and very slight; it is proportionate to the small quantity of calcium retained in the sugars of commerce, and stops when the calcium is transformed into a formiate.

Ordinary Hypnotic Solution. M. O. Liebreich gives the following:—

℞	Chloral-hydrate	2 grammes
	Mucilage of gum arabic	15 grammes
	Distilled water.	15 grammes.

A mixture is made which is to be taken in one dose.

Another Hypnotic Solution of Chloral-Hydrate.

℞	Chloral-hydrate	4 grammes
	Orange syrup	15 grammes
	Distilled water.	15 grammes.

Make a mixture, of which a spoonful must be taken at bedtime.

Sedative Draught.

℞	Chloral-hydrate	2 grammes
	Orange syrup.	50 grammes
	Mucilage of gum arabic	50 grammes
	Distilled water	120 grammes.

Mix. A spoonful to be taken every hour.

Chloral, how to Cover the Taste of. Peter Squire. (*Med. Times and Gazette.*) It may interest your readers who are now prescribing hydrate of chloral, to know that peppermint water sweetened with syrup, covers the taste of this rather nauseous medicine better than orange, orange-flower, bitter almonds, or ginger, adjuncts which I see are daily prescribed with it. If peppermint is objected to, syrup of tolu is the next best flavouring agent with which I am acquainted.

Chloral-hydrate, Syrup of. The following has been suggested, and is in extensive use; the taste of chloral seems completely covered in this simple formula:—

℞	Syr. Flor. Aurant., Syr. Simplicis	ā ā ʒx.
	Chloral-hydrate	ʒiiiss. m

Chloral, Hydrate of. (T. Spencer Wells, Oct. 2, 1869.) "I have usually prescribed thirty grains of chloral with a drachm of syrup, and ten drachms of water. With only an ounce of water the draught is rather too pungent. In Germany this dose is given with equal parts of syrup and water, half an ounce of each. Chloral is very dear. The Germans say, 'a sleep costs a dollar.' I paid £3 15*s.* for two ounces; and in July it was not easy to get it even at this price."

Chloral and its Compounds, Observations on the Preparation and Physical and Chemical Properties of. M. Eug. Lebaigne. (*L'Union Pharmaceutique.*) The existence of the following compounds is established by published investigations:—

1. *Anhydrous Liquid* Chloral . . . . . $C_4HCl_3O_2$
2. *Anhydrous Insoluble* Chloral, isomeric with the above. $C_4HCl_3O_2$
3. Hydrate of Chloral . . . . . $C_4HCl_3O_2, 2HO$
4. Alcoholate of Chloral . . . . . $C_4HCl_3O_2, C_4H_6O_2$.

The process indicated by Dumas ("Traité de Chimie Appliquée," vol. v., p. 601) is the best for the preparation of chloral.

The secondary products (hydrate and alcoholate) are most advantageously prepared by synthesis: that is to say, by the direct union of anhydrous chloral and water or alcohol, the product being rectified over carbonate of lime.

Liquid chloral, by reason of its constant acidity, odour, and the inconvenience attending its form as a fluid, should be excluded from use in medicine, and reserved as a base for the preparation of the secondary compounds.

The characters and properties of these different compounds admit of their being easily distinguishable one from another; but one reaction is common to them all, and that is, their decomposition in presence of hydrated alkalies, with production of an alkaline formiate and chloroform.

These compounds, however, yield different proportions of chloroform:—

Anhydrous Liquid Chloral Anhydrous Insoluble Chloral	81·0 per cent. of Chloroform.
Chloral Hydrate	72·2 ,, ,,
Alcoholate of Chloral . . .	61·7 ,, ,,

From this point of view, if they owe their therapeutic efficacy to chloroform, they should vary in activity.

By decomposition of the alcoholate, not only is chloroform liberated, but also 23·7 per cent. of absolute alcohol, which might also possess important physiological activity.

Chloral-hydrate in the Body, on the Decomposition of. After a series of elaborate experiments to elucidate this question, Personne comes to the conclusion that chloral-hydrate is changed by the alkali of the blood into chloroform and formiate of soda; he thus establishes the conclusions of other experimentalists. He further finds that the chloroform is eliminated from the system as chloride of sodium and formiate of soda.

Chloral as an Antidote to Strychnia. Some good evidence has been adduced in support of this idea. One drachm of the hydrate dissolved in one ounce of water, has been administered successfully to a dog poisoned by Battle's Vermin Killer.

Bromal-Hydrate. Mr. Williams has exhibited some specimens of this substance. His experiments on the subject are not complete, but he is inclined to consider that its action may be more powerful than chloral-hydrate. It is more than probable that many similar compounds will have to be described next year.

Chloroform, on the Preservation of. (Dr. H. Hager.) Experiments lead the author to the following conclusions :—

1. That commercial chloroform contains, besides chloroform, other chlorine compounds which are only with difficulty separated.

2. Chloroform is not decomposed by light alone.

3. Under the combined influence of light and air, chloroform is quickly decomposed; by diffused light, only slowly.

4. Chloroform decomposed slowly on exposure to air, even in the dark.

5. 0·75 to 1 per cent. of spirit, serves as a preservative of chloroform, especially in diffused light, for any indefinite period.

6. Chloroform occurs in a state of decomposition, in which it gives no acid reaction.

The chloroform used in subsequent experiments was obtained from chloral-hydrate; it boiled at 62·3° to 62·5° C., and had a sp. gr. of 1·5022 at 15° C. This specimen decomposed by exposure neither to light nor air. Pure chloral-hydrate seems to be the only proper material from which to obtain pure chloroform.

Chloroformum. The extensive use which is made of chloroform as an anæsthetic agent, and the danger that may result from its employment in an impure state, and especially if contaminated with products resulting from its decomposition, render it very important that the authorized process for its preparation should yield it in a state in which it not only is free from impurity when recently produced, but will remain so for a considerable time afterwards. A statement having been made to the effect that chloroform, prepared according to the Pharmacopœia process, had on several occasions become unfit for use within a few weeks after its production, I made a careful investigation of the subject, and am fully satisfied that the decomposition alluded to was caused by some deviation from the instructions given, and most likely by the use of impure sulphuric acid in purifying the crude product. I had several quantities of not less than four pounds each, made by the Pharmacopœia process, following rigidly the instructions given, and the resulting chloroform not only answered to all the tests, but has remained free from any symptoms of decomposition. One of these samples has been kept now for more than twelve months exposed to strong light. On the

other hand, a sample, in the purification of which sulphuric acid not perfectly free from nitric acid was used, began to show symptoms of the usual decomposition, in which acid fumes were emitted, in a few weeks after it was made. I have found that pure sulphuric acid, with the addition of three drops of nitric acid to every fluid ounce, if used in the purification of chloroform, will cause the decomposition to take place. Dr. Christison was, I believe, the first to suggest that a tendency to decomposition was imparted to chloroform by using, in its purification, sulphuric acid in which nitric acid was present. I find a statement to this effect in a short paper of Dr. Christison's, published as long ago as 1850, in the *Monthly Journal of Medical Science*.—Redwood.

Crotonic Acid, Synthesis of. (*Hager's Centralhalle.*) Crotonic acid is produced according to Stacewicz (*Zeitschrift f. Ch. V.*) if a mixture of chloracetine and monochloracetic acid be heated with finely reduced metallic silver in a sealed glass tube at a temperature of 140° C.

$$C_2H_3Cl + C_2H_3ClO_2 + 2Ag = C_4H_6O_2 + 2AgCl.$$

The crotonic acid thus formed is like that from croton oil, an oily liquid of weak aromatic smell, boiling at 127° C., soluble in water, and acting as an irritant on the skin.

Croton Oil, the Volatile Acids of. Fröhlich having observed in the Jena laboratory that by the action of phosphorus penta-chloride upon ethyl-diacetic acid, two metameric chlor-acids were obtained, yielding, when treated with sodium amalgam two metameric acids, of the composition $C_4H_6O_2$, of which one was solid, and identical with that prepared from allyl-cyanide, the other was fluid, and supposed to be the same as that prescribed by Schlippe as occurring in croton oil, and called crotonic acid, Geuther undertook a confirmation of this supposition. Having prepared the volatile acids from four pounds of croton oil, he finds that no volatile acid of the composition $C_4H_6O_2$ exists in the oil, and that the solid acid contained in it is not as indicated; and therefore that Schlippe's statements are entirely erroneous. The volatile fluid acids are essentially acetic, butyric, and valeric, mixed perhaps with traces of œnanthic acid, and higher members of the oleic series. The solid acid supposed by Schlippe to be angelic acid, is a metamer of it, to which Geuther gives the name tiglic acid. It constitutes more than a third of the volatile acids of croton oil, and forms a barium salt readily soluble in water, crystallizing in pearly plates, and having the composition $C_5H_7Ba'O_2 + SH_2O$. It has a remarkably close correspondence in properties with the methyl-crotonic acid of Frankland Duppa. It

is therefore obvious that the name crotonic given to the acid $C_4H_6O_2$ is a misnomer, since croton oil contains no acid of this composition. Geuther therefore proposes to call the chlor-acid of Fröhlich, mentioned above, which fuses at 59·5°, and boils at 194·8° monochlor-quartenic acid, and the acid derived from it by the action of sodium amalgam, which is fluid at 15°, and boils at 171·9°, quartenic acid. For the metamer of the chlor-acid, melting at 96°, and boiling between 206° and 211° with partial decomposition, he proposes the name monochlor-tetracrylic acid; and for its derivative $C_4H_6O_2$, first prepared from allyl-cyanide, and till now called crotonic acid, the name tetracrylic acid. Its aldehyd, called croton-aldehyd by Kekulé, would therefore be tetracryl-aldehyd.—*Zeitschrift der Chemie*, II., vi., 26 Dec., 1869; from the *American Journal of Science and Arts* for July, 1870.

Cryptophanic Acid, the Normal Free Acid of Human Urine. At a recent meeting of the Chemical Society, Dr. Thudichum described a new organic acid,—cryptophanic acid, the presence of which he considers the cause of the acid reaction usually exhibited by urine.

It is extracted somewhat as follows:—"The urine is rendered alkaline with milk of lime, and filtered, it is then acidified with acetic acid and evaporated down to a syrup; after standing some time, the syrup is drained from the crystalline deposit, and is mixed with strong alcohol. On shaking, a dark-coloured precipitate forms, from which the fluid is decanted.

The precipitate, which is the impure calcium salt, is washed with alcohol, dissolved in a small quantity of water, and filtered through calico. On again adding alcohol, it is reprecipitated. By repeated solution and reprecipitation in this way it may be obtained nearly pure.

To complete the purification, the calcium salt is dissolved in water, mixed with solution of lead or copper acetate, the liquid filtered from the impure basic salt, and the clear solution mixed with alcohol. Pure lead or copper cryptophanate is then precipitated. To obtain the acid, the lead salt may be decomposed with an equivalent quantity of dilute sulphuric acid, or the copper salt by the sulphuretted hydrogen.

The acid is a colourless gummy mass, soluble in water; it decomposes carbonates with effervescence. The aqueous solutions of the earthy salts give, amongst other reactions, with mercury nitrate, a voluminous white precipitate. The ordinary estimation of urea by Liebig's process is thus shown to be liable to errors, and to require a

correction for cryptophanic acid, which has probably increased all values for urea by from 5 to 10 per cent. Cryptophanic acid may be considered a dibasic acid of the formula $C_5H_9NO_5$; or it may be represented as tetrabasic with the formula $C_{10}H_{18}N_2O_{10}$. In that case, the metallic salts, of which a considerable number are described in the original paper, will have the general formula $C_{10}H_{14}M'_4N_2O_{10}$. Many of the salts are soluble in water, but some, as those of silver, lead, and mercury, are insoluble.

Cytisine. Till within the last few years the *Leguminosæ* have generally been regarded as harmless or containing no poisonous principle; this belief was much shaken when the properties of the Calabar bean became known. Lilienfeld observed a remarkable action of the seeds of the bladder senna (*Cytisine laburnum*) which Husemann and Marmé established by the discovery therein of a poisonous alkaloid, cytisine. Besides the seed, the bark and the leaves show the same properties of an irritant poison; the symptoms are nausea, giddiness, in some cases vomiting, in others purging, generally a cold sweat, and great weakness in the legs; in one case absence of mind was remarked. Husemann has lately added to our knowledge of cytisine, and corrected a statement made by himself and Marmé, that the seeds contain a second alkaloid, laburnine, as they called it; this substance has been recognised as nitrate of cytisine.

To prepare cytisine, the coarsely pounded seeds are macerated for some time in cold water, acidified with sulphuric acid, the liquid decanted, the residue is pressed, the solution nearly neutralised with chalk; decant after subsidence; precipitate with acetate of lead; remove excess of lead from the solution by sulphuretted hydrogen; neutralise with soda; precipitate with gallic acid; keeping the liquid neutral or slightly alkaline, collect the precipitate; triturate with finely divided litharge and water to a paste; dry by warmth; extract with strong spirit; concentrate the extract to a syrup; add nitric acid till strongly acid, then six or eight times the volume of absolute alcohol; heat to boiling, and set aside to cool. After a few hours pour the liquid off the resinous mass, place by itself, when after a few days nitrate of cytisine will crystallize out; recrystallization from hot water renders it white. The base is prepared from the nitrate by heating with strong caustic potash solution; it separates as an oil when hot, which solidifies on cooling.

Pure cytisine consists of white radiating crystals permanent in the air, of a bitter and at the same time slightly biting taste; it melts at 154° and sublimes completely with cautious heating, forming

splendid crystals. It dissolves in water in all proportions; with nearly the same facility in spirit; but in ether, benzol, disulphide of carbon, and chloroform, scarcely at all. In precipitating the earths, and all the oxides of the heavy metals, and displacing ammonia from its combinations, it shows itself to be one of the most powerful of the vegetable alkalies.

Besides its occurrence in *Cytisine laburnum* it has been met with in two other species of this group.

Ergot, Contributions to the Chemistry of. Johann Carl Hermann. (*Vierteljahresschrift, Wittstein's.*) The author disproves the statement of Manassewitz that the fatty oil contained in ergot is readily saponifiable by soda and not by potash. From about 20 ounces of ergot extracted by ether he obtained 6 ounces of this oil. It had a brownish yellow colour, a thick fluid consistency, and yielded by exposure to a low temperature a solid fat; it possessed an aromatic smell and harsh taste. Its specific gravity at 18° C. was 0·9249; the thinnest layers on exposure to the air did not dry up. Distilled with a solution of caustic soda, it yielded ammonia and trimethylamine. The colour was due to ergotin. The oil was found on examination to be a mixture of the glycerides, tripalmitine, and triolëine, besides which, traces of butyric and acetic acids. The alkaloid ecboline, discovered by Wenzell, was identified: it is soluble in acohol and water, has a bitter taste and alkaline reaction, and gives precipitates with the following reagents:—

1. With corrosive sublimate—white.
2. Phospho-molybdic acid—yellow.
3. Gallic acid—a dirty white.
4. Iodised iodide of potassium—red brown.
5. Choride of gold—brownish.
6. Chloride of platinum, after a short time—orange.
7. Cyanide of potassium—white.

Ether, Methyl-ethylic. Dr. B. W. Richardson, F.R.S., brought before the Medical Society of London the results of his recent experiments on the production of a rapid general anæsthesia for short operations, and introduced a new anæsthetic compound, which promises to become a most valuable agent in surgery and dentistry. We are indebted to the *Lancet* for the following abstract of Dr. Richardson's important communication:—He began by explaining that, within the past two or three years, a practice had been followed of producing quick insensibility which should be followed by equally quick recovery. Two agents had been employed for this purpose:

(*a*) nitrous oxide gas; (*b*) bichloride of methylene. Admitting that the principle of producing quick insensibility had a practical intention and usefulness, Dr. Richardson said he had an objection to the methods which, up to the present time, were adopted for carrying the principle into practice. His objections to nitrous oxide gas were as firm as ever. He held still that the employment of an agent which excluded all atmospheric air during inhalation, which produced the most perfect asphyxia, which required for its administration costly and troublesome apparatus, and which, if administered beyond a given period, even for a few seconds, must of necessity kill, was a bad agent for anæsthetic administration—was, in fact, a rude and vulgar process, retrogressive in science. Respecting bichloride of methylene, though it was hard to speak against any application of a remedy which he (the author) had introduced, he must be candid, and say that he was not favourably impressed with the application of bichloride for *quick* general anæsthesia. That it was marvellously rapid in its action was true, that it answered the end had in view was true, and that it had now been used for rapid inhalation an immense number of times was also true; but these facts could not conceal the further and all-important fact that the bichloride of methylene belonged to a dangerous family of chemical substances, and could not, therefore, be played with without risk. It had been extolled as being safer than chloroform; and that was allowed, for, as it contained an equivalent of chlorine less than chloroform it was materially safer. But the safety was relative, not absolute. Under these impressions the author was led recently to review experimentally the action of the whole of the more promising anæsthetic fluids and vapours, including chloride of methyl, bichloride of methylene, chloroform, amylene, hydride of methyl, ethylic ether, methylic ether, and some others, which were given on a table placed before the society. The result was that he had decided in favour of methylic ether for rapid anæsthesia. The anæsthetic properties of methylic ether were first discovered by Dr. Richardson in 1867, and the substance has been reported upon by him in two reports to the British Association for the Advancement of Science. On the 20th of May, 1868, he inhaled it for the first time himself. Dr. Sedgwick and Mr. Peter Marshall administered it to him to complete insensibility. He was narcotised completely in one minute, was unconscious in seventy seconds, and recovered almost instantaneously without nausea, headache, or other unpleasant symptom. From that time the author has been in the habit of narcotising occasionally with methylic ether, and recently with marked success.

The ether is made by digesting one part of pure methylic alcohol with two of strong sulphuric acid. The mixture is heated, and the methylic ether, which passes over as a gas, is subjected to frequent washings in a strong solution of potash. The ether remains as a gas even below zero; it has an ethereal odour; it is chemically an oxide of the radical methyl; and its vapour density is 23, taking hydrogen as unity. The strongest objection to methylic ether is that it is a gas; but, happily that difficulty is to a large extent overcome, the gas being very soluble in various substances; water takes up 37 volumes of the gas, yielding an ethereal fluid of a very pleasant taste; pure ethylic ether and alcohol take up over 100 volumes, and chloroform and bichloride of methylene nearly as much. For practical purposes, the author prefers absolute ethylic ether of specific gravity 7·20, and boiling point of 9·20° Fahr. as the solvent. The ether is charged with the gas at a temperature of 32° Fahr., and the compound is at once bottled and firmly corked down. It should be kept for a time before being used, the process of keeping producing a comparatively stable compound. In using this compound, which he proposes to call methyl-ethylic ether, the author at present employs the simple mouthpiece invented by Mr. Rendle, and made merely of leather. He is adding to this a reserve bag, in order to conserve the ether. From one to two drachms may be put into the inhaler, for quick narcotisation. Dr. Richardson next described cases in which the methylic ether had been administered to the human subject for the extraction of teeth. In eleven cases, the whole operation, from commencement of the inhalation to the complete recovery, was under three minutes; in several cases one minute was sufficient; while in two cases forty-five seconds sufficed. In no case was there spasm, syncope, or asphyxia during inhalation, or any after-nausea, and in all cases there was a semi-consciousness, so that the patients did what they were bade to do, remembered what had been done, and yet were not conscious of pain. The author next described the action of methyl-ethylic ether on the nervous centres, comparing it with chloroform and other anæsthetics containing chlorine. He showed that this ether produced no excitation of the nervous centres which supply the vascular system, as chloroform does, and that, consequently, there was absence of muscular spasm, of contraction of blood-vessels, and of syncope from fatal contraction of the heart. When it was carried to the extent of arresting life in the inferior animals, it produced death by paralysing the organic nervous centres. This extreme result was preceded by convulsive action similar to that which is seen in death from hæmorrhage, the convulsion being due

to the absence of arterialised blood in the muscles. So well, however, did the heart still retain its power, that in one case, in a lower warm-blooded animal, a guinea-pig, the respiration returned *spontaneously* in pure air, four minutes and forty-five seconds after it had ceased. No fact could more definitely speak in favour of the safety of the the agent. In conclusion, the author said that as he had confined himself this time to rapid anæsthesia for short operations, his remarks must be taken as bearing on that subject only. He had introduced methyl-ethylic ether as the readiest and best agent he knew of for the purpose described. It was better than nitrous oxide gas, because it allowed air to be given with it, and did not asphyxiate. It was better than bichloride of methylene, because it did not produce muscular spasm and syncope. At the same time, he did not consider it as perfect, nor should he consider general anæsthesia perfected until he, or some other observer, should discover an agent that will destroy sensibility without interfering at all with the organic muscular life, volitional power, or consciousness. Methylic ether approached this perfection, though it did not touch it, and it encouraged perseverance in experimental research. For these reasons it was worth the attention of the society.

Eucalyptol. M. Cloëz has obtained this new substance from the *Eucalyptus globulus*, a tree belonging to the order *Myrtaceæ* a native of Tasmania, but naturalised on the shores of the Mediterrannean. 10 kilogrammes of fresh leaves gathered in Paris from branches which have been attacked by the cold, yielded by distillation in water 275 grammes of the essence, or 2·75 per cent. 8 kils. of dried leaves gathered at Hyères, 489 gr. or more than 6 per cent. Perfectly dried leaves gathered at Melbourne and preserved for five years, yielded little more than 1·5 per cent of the essence. The essential oil obtained under these different circumstances is identical; it is a fluid liquid, scarcely coloured, endowed with an aromatic odour similar to that of camphor. Heated in a retort, it begins to boil at 170°, the thermometer rising rapidly to 175°, where it remains stationary until about half the products have passed over; another portion of the essence passed between 188° and 190°, which is a mixture of several products; and finally a small quantity of a volatile liquid is obtained at a temperature above 200°. The liquid distilled in the first place between 170° and 178° is not a chemically pure product; in order to purify it, it is necessary to place it in contact with pieces of potash, and afterwards with fused chloride of calcium; when again distilled, a very fluid liquid is obtained, colourless, and boiling uniformly at 178°, which M. Cloëz calls eucalyptol.

It is lighter than water, its density at 8° being ·905; it turns the plane of polarisation to the right; it remains liquid after an exposure for three hours to a cold of 18°, obtained by a mixture of snow and salt; it has a cool agreeable taste; it is scarcely soluble in water, but completely in alcohol, even when hot; this solution when very dilute, possesses an odour similar to that of the rose. Eucalyptol has been successfully employed in therapeutics. Its composition is represented by the formula $C_{24} H_{20} O_2$; its vapour-density determined by experience, is 5·02; calculated theoretically from the formula $\frac{C_{24} H_{20} O_2}{4}$ it is 6·22. Ordinary nitric acid attacks it but slightly; among the products of the reaction is a crystallizable acid not containing nitrogen, the composition of which is not yet determined, but probably analogous to camphoric acid. With concentrated sulphuric acid, it becomes black; the mixture if left to itself and then heated with water, deposits a substance of a pitchy consistence, from which a volatile hydrocarbon is separated by distillation. With anhydrous phosphoric acid a hydrocarbon is obtained: a colourless fluid, boiling uniformly at 165°, with the density ·836 at 12°, and differing from eucalyptol by having two equivalents of water less, $C_{24} H_{18}$, with the vapour density 5·3. M. Cloëz calls it eucalyptene, corresponding to cymene. Anhydrous phosphoric gives in addition a liquid boiling at a temperature above 300°, of which the percentage composition is the same as eucalyptene, and which he calls eucalyptolene. Dry gaseous hydrochloric acid is rapidly absorbed; a series of changes taking place, which end finally in the production of a hydrocarbon boiling at 168°, apparently identical with eucalyptene. Eucalyptol appears to be analogous to camphor, and its derivatives can be compared with those of that substance. The homology however is not complete, as, being two steps higher in the series, its boiling point should theoretically be about 38° higher, whereas the reverse is the case.—*Comptes Rendus*, March 28th, 1870.

Hydrogen, Peroxide. Mix, in the state of fine powder, 17 parts of crystallized barium hydrate with three parts of potassium chlorate, and fuse at a gentle heat; the fused mass is treated with cold water, to remove the potassium chloride; the residue cold is mixed with 8 parts of glacial phosphoric acid dissolved in 25 parts of water, and then immediately cooled with ice. After a time the solution is decanted from the precipitate. It constitutes the golden hair-wash that imparts a yellowish red tint to dark hair.—*Hager's Centralhalle.*

Hydrogenium. "My dear Hofmann,—There is a communication

of mine before the Royal Society at present, which I believe will amuse you, or at least the *hardiesse* of the thing will surprise. What do you think of hydrogenium, a white magnetic metal of the specific gravity 2? I remain, dear Hofman, sincerely yours, Thos. Graham."

An elaborate account of this metal will be found in the *Proceedings of the Royal Society*, vol. xvii., pp. 212, 500; reported also in the *Journal of the Chemical Society*, vol. xxii., p. 419. "It has often been maintained on chemical grounds that hydrogen gas is the vapour of highly volatile metal.

"The idea forces itself upon the mind that palladium, with its occluded hydrogen, is simply an alloy of this volatile metal in which the volatility of the one element is restrained by its union with the other, and which owes its metallic aspect equally to both constituents. How far such a view is borne out by the properties of the compound substance in question, will appear by [the following] examination of the properties of what, assuming its metallic character, would fairly be named hydrogenium."

Details follow respecting its—1. *Density*, which on experiment appears to be 0·7401. Taking the density of hydrogenium at 7, and its atomic weight =1, the following results may be deduced by calculation. The atomic volume of lithium is 0·826, or less even than that of hydrogenium (1). The atomic volume of iron is 5·026, of magnesium 4·827, of copper 4·976, of manganese 4·81, and of nickel 4·67. These five metals have atomic volumes nearly five times that of hydrogenium. The atomic volume of aluminium on the same scale is 7·39, of sodium 10·56, and of potassium 31·63.

2. Tenacity. 3. Electrical conductivity. Taking the conducting power of pure copper wire as 100, then we have

Palladium	8·10
Palladium + Hydrogen	5·99.

4. Magnetism. 5. Palladium with hydrogen at a high temperature; and lastly, 6. Chemical properties. These distinguished hydrogenium from ordinary hydrogen.

"The palladium alloy precipitates mercury and calomel from a solution of the chloride of mercury, without any disengagement of hydrogen; that is, hydrogenium decomposes chloride of mercury, while hydrogen does not. This explains why M. Stanislas Meunier failed in discovering the occluded hydrogen of meteoric iron, by dissolving the latter in a solution of chloride of mercury: for the hydrogen would be consumed, like the iron itself, in precipitating

mercury. Hydrogen (associated with palladium) unites with chlorine and iodine in the dark, reduces a persalt of iron to the state of protosalt; converts red prussiate of potash into yellow prussiate, and has considerable deoxidizing powers. It appears to be the active form of hydrogen, as ozone is of oxygen."

Hyoscyamine. By E. Thorey. Henbane contains alkaloid in greatest quantity in the leaves, next in the fruit, then in the roots, and lastly in the twigs. The soil and climate influence the plant so far that untilled nitrogenous soil, with a moderate and warm climate, yields plants richer in hyoscyamine than those grown in gardens, or belonging to colder countries. The quantity of the alkaloid is always very small: even in the dried leaves only about $\frac{1}{4}$ per cent. is found, and in the fruit only $\frac{1}{6}$ per cent.

For the preparation of hyoscyamine the plant is made use of less often than the seed, because there are but trifling difficulties in the way of obtaining the product pure from the latter. It is of importance, however, to remove most completely the fatty oil from the seed; and as, according to Dragendorff, hyoscyamine does not dissolve in petroleum spirit, so is that solvent the best for the purpose. After this operation the almost dust-like powder is treated with alcohol of 85 per cent., to which are added a few drops of hydrochloric acid, digested for two days at 30° C., pressed, treated again in the same way. The extracts, mixed, are filtered; the greater part of the spirit is distilled off, so that the residual liquid amounts to about $\frac{1}{5}$ of the whole; half the bulk of water is added thereto, evaporated in the water-bath, till the liquid is reduced to the volume it had previous to the addition of water; it is filtered from the separated resin, and evaporated in vacuo to about one half. For the removal of still dissolved impurities, the so-far concentrated liquid is shaken with chloroform, by which only traces of hyoscyamine are dissolved, separated from the chloroform, made alkaline with potash, and again shaken with chloroform. This shaking with the chloroform is repeated, the chloroform washings are mixed and washed with distilled water as long as it becomes coloured; the alkaloid is then taken from the chloroform by weakly acidified water, containing hydrochloric acid. On evaporation of the acid liquid there remains a yellowish white hydrochloride of hyoscyamine, crystallized in needles placed crosswise. One kilogr. of seed yields about $\frac{1}{2}$ gramme of substance. By shaking the aqueous and alkaline solution with chloroform, and evaporation of the latter, the akaloid is not obtained as needles. Instead of chloroform, benzole or ether may be used. Properties of hyoscyamine: It is permanent in the air, amorphous or crystallized; it forms in the

purest state a white, odourless mass, with alkaline reaction and bitter taste. From chloroform it crystallizes in rhombic tables, from benzine it is fine needles, from ether and amylic alcohol it is uncrystalline. It dissolves in warm water, dilute alcohol, ether, chloroform, benzine, amylic alcohol, and dilute acid; it is more difficultly soluble in cold water and absolute alcohol; it sinks in water. Its solutions in hydrochloric, sulphuric, nitric, phosphoric, and acetic acids give well and easily crystallized compounds. The composition and constitution of hyoscyamine has not been established for want of material. Henbane contains a peculiar acid, the nature of which has not yet been ascertained.—*Vierteljahresschr. f. Ph.; Hager's Centralhalle.*

Iodine, Action of, on Soap and Gum Arabic Solution. The action of iodine on soap, according to Husson, is to form an alkaline iodide and a fatty acid. The action on gum arabic is similar: an alkaline iodide results, and arabinic acid (arabin) is set free.—Hager.

Iodides, Double, varying Colour of some. By Edward Mensel. Wishing to obtain some double iodides, the author precipitated the double iodide of potassium and mercury with silver nitrate; a yellow precipitate resulted, which under slightly warmed water became intensely red; on cooling, it returned to its former colour. If the double iodide of potassium and mercury, as a warm solution, be treated with sulphate of copper and sulphurous acid, a precipitate is obtained, which, though red at 40° C., is black at 70° C.

Iodine in Mixtures of Fatty and Volatile Oils. (*Journ. de Pharm. et de Chim.*, vol. xi., p. 137.) M. Demeyer remarks, that it is a well known fact that iodine at first gives a brown colour to aqueous mixtures which contain volatile oils in solution, and that this colouration disappears after a short time, sometimes immediately. When 1 decigramme of iodine is dissolved in a solution of from 5 to 10 grammes of oleosaccharum of mint in from 100 to 200 grammes of distilled water, the brownish colour will have disappeared in a quarter of an hour, and the mixture will be entirely colourless. Iodine enters into the elementary composition of the volatile oil in the proportion of half, displacing an equivalent quantity of hydrogen, which, with the remainder of the iodine, forms hydriodic acid.

Other substances exist which increase the action of iodine on the fatty and volatile oils, and which even form colourless mixtures quite unexpected, from the great quantity of iodine employed. Among these, bichloride of mercury must be specially mentioned. When equal parts of iodine and corrosive sublimate are dissolved in alcohol, the liquid has the colour of tincture of iodine; and when mixed with

volatile oils, with petroleum, benzine, or with liquid fatty oils, or solid fats, thick mixtures are formed, which, in some cases, are brown at first, but become, after a few minutes, entirely colourless.

Iron and its Compounds.—Iron obtained by an electric current. (*Monit. Scient.*) In order to obtain iron divided by an electric current, M. Collas uses a dilute solution of chloride of iron. The electricity is produced by Bunsen's pile; the iron obtained will be absolutely pure. All foreign bodies, phosphorus, sulphur, arsenic, manganese, carbon, etc., remain in the bottom of the bath. It is dry, crystalline, more friable than glass, and can be easily reduced to powder. It is very oxidable; and when poured in the form of powder into a bottle in damp weather, it decomposes the moisture, fixing the oxygen, while the hydrogen causes the bottle to burst.

Ferrum Pulveratum, Presence of Lead in. This preparation not unfrequently contains lead as an impurity. About 0·5 grammes (7½ grains) are treated with a little water, and then 4 c. c. (about a drachm) of 25 per cent. hydrochloric acid is gradually added, and subsequently 3 c. c. of nitric acid; the solution is evaporated to quarter its volume, nearly neutralised with ammonia, then 5 or 6 grammes of acetate of soda with 35 to 40 c. c. of water are added, the liquid is boiled 4 or 5 minutes, filtered, and tested with chromate of potash. According to the proportion of lead present, there results after a few minutes either a yellow turbidity or a similar precipitate.

Iron, Saccharate of (Ferri Saccharat.) (*Mon. Scient.; Bull. Soc. Pharm.*, 1870.) Dr. F. Gerhard informs us that according to Hager, the most simple way of preparing saccharate of iron is to take a given quantity of *perchloride* of iron, to precipitate the iron in the form of hydrate of peroxide, and wash it. A small quantity of caustic ammonia is then added, and it is dissolved by heat into some syrup of sugar.

In order to have this product in a state of greater purity it is precipitated with alcohol, washed and pressed, then redissolved in a small quantity of water. This operation is repeated three times, the produce thus obtained is while moist soluble in water and in syrup of sugar, but when it is completely dried in the air it becomes insoluble in these two liquids. The moist precipitate contains a certain quantity of ammonia which it loses when dried; that is the reason of it being soluble when moist. The insoluble saccharate is easily dissolved when ammonia is added, and it becomes again insoluble if an acid is used to neutralise the alkali. But a very small quantity of alkali, potash, or ammonia, in presence of the sugar, is sufficient to hold the saccharate of iron in solution.

If *chloride* of sodium, nitrate of potash, or any other analogous salt be added to a solution of saccharate of iron without sugar, the deposit is formed more rapidly. If a great quantity of salt is employed, the precipitate is formed even in presence of a liquid which is strongly alkaline.

By precipitating the ammoniacal saccharate of iron with alcohol, and then adding powdered sugar, a mixture is obtained which can be completely dried and even warmed considerably without rendering it insoluble. That probably arises from the fact that the ammonia which is evolved is absorbed by the sugar, with which it contracts a pretty stable combination. It is well known that sugar in powder and in a dry state can absorb as much as 5 per cent. of ammonia gas. It is generally preferable to have medicinal substances in a pure and unmixed state; but in this case the addition of the sugar presents incontestible advantages. The solution of saccharates of iron can be boiled without disturbing them as long as the liquid contains ammonia.

Iron Sugar (Ferrum Saccharatum). Dr. Walter G. Smith, of Dublin (*Pharm. Jour.* [2], vol. xi., p. 19.) in an examination of a sample of Chanteaud's *sucre ferrugineux* obtained results inconsistent with published statements respecting the perfect solubility of this preparation. The ferruginous sugar occurs in small, cubical, reddish-brown crystals, having a sweet taste with a slight chalybeate after-flavour. On treating a few grains with cold water, Dr. Smith noticed that insoluble ferric oxide was almost immediately detached from the crystals and diffused mechanically through the solution. The solution was filtered, and the filtrate having been acidified was tested with potassium sulphocyanide and ammonium sulphide. The only indication of the presence of iron was the slightest possible tinge of blue with the ferrocyanide. The filtrate on standing deposited an additional trace of ferric oxide, and when this was separated by filtration, the solution of sugar was perfectly colourless and transparent, and gave negative evidence with the tests for ferric salts. By the ignition of weighed quantities of the ferruginous sugar, the author obtained residues of ferric oxide corresponding to 0·47 and 0·48 per cent. He calls attention to the smallness of this percentage, and states that 1041 grains of the ferruginous sugar would be required for a dose equivalent to 5 grains of the officinal ferri peroxidum hydratum.

C. H. Wood (*Pharm. Journ.* [2], vol. xi., p. 70.) examined a sample of *Chanteaud's sucre ferrugineux*, in April, 1869. Treated with cold distilled water it gave a red solution from which only a trace of insoluble

oxide could be separated by a filter of Swedish paper. When the clear red filtrate was warmed, ferric oxide was precipitated, and the liquid became colourless. In July, he repeated his experiments with a portion of the same sample, and obtained a pale straw-coloured solution, with a considerable residue of insoluble oxide. It would appear, therefore, that the ferruginous sugar does not retain its solubility for an unlimited time, and that the sample examined by Dr. Smith had reached the extreme stage of deterioration.

Iron Sugar (Sucre Ferrugineux) has been introduced as a commercial article: it appears to be pure hydrate of peroxide of iron associated with cane sugar. The strength is weak—two or three teaspoonfuls after meals may be taken for a dose.

Lead, Sub-acetate of, Crystallized. (*Journ. de Pharm. de Bordeaux.*) M. Jeannet proposes the following method of preparing *sub-acetate* of lead.

℞ *Neutral Crystallized* Lead Acetate	6
Pure Litharge in scales	2

Mix the salt and the oxide by trituration, and add,

Distilled Water	1

Heat it in a porcelain capsule, stirring gently with a glass rod. The fusion of the mixture takes place at about + 65°, and ebullition at + 102°. After two or three minutes of ebullition, filter through paper on a funnel heated in a water bath. The sub-acetate of lead thus formed crystallizes on cooling into beautiful silky tufts, leaving a very small quantity of remaining liquid. It yields a solution at 35° B. when dissolved in double its weight of distilled water.

Lime, Saccharate of, as a Substitute for Lime Water. (Dr. Schönn.) On account of its disagreeable taste, and still farther its very slight solubility necessitating such large doses, there is frequently great difficulty in administering lime water to children. The author, to obviate this, recommends the use of lime in the form of saccharate. The white precipitate of neutral saccharate of lime, which is obtained by precipitating by alcohol a solution of milk of lime in syrup, is easily soluble in water at ordinary temperatures, and very so in syrup. In order to have a larger quantity of lime in the compound, the dibasic saccharate may be prepared by precipitating a sugar solution containing excess of lime by alcohol, and dissolving this in white syrup. The taste of saccharate of lime is far less disagreeable than lime water, and may be, by means of syrup, almost entirely concealed.

Lime, Sulphate, in Water: an easy Method of Freeing Water from Sulphate of Lime. By E. Reinsch. To about 40 gallons of water in a clean butt, is added half a pound of finely-ground witherite (native carbonate of baryta). The water is well stirred up, and allowed to stand. After 24 hours the water has become quite clear, and contains not a trace of sulphate of lime, as a solution of chloride of barium causes no turbidity. The water now contains some carbonate of lime, which is of course precipitated on boiling.—*Pol. Notizbl.; Hager's Centralhalle.*

Litmus Paper. Various authorities recommend glazed paper, as being more delicate in its sensitive powers. Nearly all the litmus papers of commerce are so prepared. In a short time the colour fades; and although the blue tinge may be temporarily restored by an ammoniacal vapour, still, for testing purposes, such papers are comparatively useless. A. Varhu suggests paper sized with isinglass solution; W. Casselmann thinks note paper answers the purpose. Secondly, we are directed in manuals and works of reference to make two preparations: one, the solution; the other, the tincture; and to filter both. Thirdly, paper so made is directed to be dried either in the air or at a gentle heat. This being so contrary to my experience, I venture to suggest the following:—

Commercial Litmus (not in cakes)	℥iv.
Distilled Water	℥xx. or q. s.

Evaporate slowly to about ℥v.; pour off the supernatant liquor and set aside to deposit. Repeat this process three times, on each occasion allowing the liquid to deposit. Mix the resulting twenty ounces, slowly evaporate to ten ounces, and when cool, add one ounce of rectified spirit. Next, select unsized bibulous paper of very open texture. Cut it into serviceable lengths, and draw each piece rapidly through the solution. Let them dry as quickly as possible before a bright, open fire. The maximum time for drying should not exceed two minutes; trim the edges, and keep either in sheets or in the usual books. Sour paste or glue used for insertion effectually upsets the result. Litmus paper thus manufactured is sensitive and stable. Filtration is to be avoided.

Red litmus paper is best made by exposing blue litmus paper to any fuming acid vapour, such as that of hydrochloric or nitric acid. This latter need never be kept in stock; a few seconds only being required to complete the change.—Ince.

Manure, Blood Cake as. In the neighbourhood of the Schlachthof, at Königsberg, in Prussia, Herr Leydler has established works for

the preparation of albumen. As a residue, there remains blood-cake, a highly nitrogenous material, available as a manure, and frequently used, especially together with bone meal. This cake appears on the outside to be a stiff jelly-like mass, and only within is it at all pappy; so rich is it in nitrogen, and so easily could the excess of water be got rid of, that it would well bear transport, its price being trifling.

Marking Ink. One drachm of aniline black is rubbed up with sixty drops strong hydrochloric acid, and $1\frac{1}{2}$ oz. alcohol. The resulting liquid is then to be diluted with a hot solution of $1\frac{1}{2}$ drachms of gum arabic in six ounces of water. This ink does not corrode metallic pens, is affected neither by concentrated mineral acids, nor by strong lye. If the aniline black solution be diluted with a solution of $1\frac{1}{2}$ oz. of shellac, in 6 ozs. of alcohol, instead of with gum water, an ink is obtained, which when applied to wood, brass, or leather, is remarkable for its extraordinary black colour.—*American Artisan.*

Methylamine, Acetate of. (*Bull. Thérap.*) M. Personne has succeeded in showing that the cafeine which disappears during the torrefaction of coffee is not carried off with the volatile products, but is transformed into a volatile base, methylamine, which was discovered by M. Wurtz.

If pure cafeine is submitted to the action of heat, and the vapour passes through a tube heated to nearly 300°, and filled with pieces of pumice stone, only a weak decomposition takes place. But an entirely different result is obtained, if instead of pure cafeine we take this substance in the form in which it exists in the berry. According to M. Payen, cafeine exists in coffee in the form of tannate; and by submitting tannate of cafeine prepared with tannin of the gall nut, to the action of heat, methylamine is obtained as from the green coffee. Methylamine of roasted coffee is easily obtained by distilling extract of coffee prepared with cold water, with a weak base, such as chalk, as the addition of this alkali to an infusion immediately sets free the methylamine, the ammoniacal smell of which is quickly observable. The alkaline liquid thus obtained is then saturated with hydrochloric acid, and evaporated to dryness; the residue is treated with boiling rectified alcohol, which dissolves the salt of methylamine in a state of great purity. This salt distilled with potassium, loses its base, which remains in the water, in which it is very soluble; and lastly, by saturating this alkaline liquid with acetic acid, an acetate of methylamine is obtained which can be used in the same way as acetate of ammonia. This base has been

extracted from coffee in sufficient quantities to be recognised by its physical and chemical qualities, and by the double chloride which it forms with platinum. It is probably to this substance, and not to cafeine, that coffee owes its exciting action. M. le Professeur Behier having administered it to patients, gives the following as the result: acetate of methylamine (1) increases the *arterial* tension; (2) has little influence on the frequency of the pulse; (3) in certain cases when given in large doses it makes the pulse irregular.

Nicotine, new Antidote to. M. Armand states that the results of a series of experiments show that the common watercress (*Nasturtium officinale*) is an antidote to the poisonous properties of tobacco: destroying the nicotine, while preserving the aroma. He proposes to employ a solution, of which the base is the watercress, with which it will be sufficient to moisten the tobacco intended for smoking, the deleterious principle being thus destroyed.—*Comptes Rendus*, Aug. 30th, 1869.

Nitrogen, Preparation of Pure. Berthelot. (*Bull. Soc. Chim.*, April, 1870, 314) gives a simple process for preparing pure nitrogen without the aid of special apparatus. In a flask, having the capacity of from ten to fifteen litres, about 200 grammes of copper turnings (free from other metals) are placed, and partially covered with solution of ammonia. The flask is stopped by a cork provided with a safety-tube, and also with an ordinary delivery-tube which is temporarily closed by means of an india-rubber cap. The contents of the flask are allowed to react for a day or two, being agitated from time to time. The oxygen of the air originally in the flask is thus completely absorbed, and also that of the air which enters by the safety-tube with variations of pressure and temperature. The nitrogen remaining in the flask, may then be displaced by water supplied from another flask of the same capacity. This water should be deprived of its dissolved oxygen by the aid of a little ammonia and copper turnings. Having been washed with concentrated sulphuric acid, the nitrogen is then collected over water or mercury, unless it is to be used directly in some reaction.

Oxygen, Cold Preparation of very Pure. (*Journ. de Pharm. et de Chim.*, vol. xi., p. 141.) M. Boettger gives the following method. Take a bottle furnished with a tube and funnel, and put into it a mixture composed of equal parts of lead peroxide and barium peroxide, then add some weak nitric acid; the reaction takes place immediately, the effervescence is performed quietly, and the oxygen is collected cold over a tub of water.

Peru, Balsam of, the Volatile Parts of. (*Deutsche Chem. Gesell.*,

1869, 180). Mr. K. Kraut says that when balsam of Peru is submitted to fractional distillation in carbonic acid and under pressure less than that of the atmosphere, it is separated into three distinct portions.

The first, not very abundant, distills at about 200°; this is benzylic alcohol $C_{14} H_8 O_2$, contaminated with a few traces of foreign matters. On analysis, this product yields results agreeing with the preceding formula; when oxidised with chromic acid, it changes into benzoic acid, without disengaging carbonic acid, absorbing 27·96, per cent. of oxygen (theory 29·63).

The second product constitutes the largest part of the essence. It boils at about 300°; it is an ether,—benzoic ether of benzylic alcohol $C_{28} H_{12} O_4$.

Benzoic Acid. *Benzylic Alcohol.* *Ether.*

$$C_{14} H_6 O_4 + C_{14} H_8 O_2 - H_2 O_2 = C_{28} H_{12} O_4.$$

When saponified with alcoholic potash, it decomposes into benzoic acid and benzylic alcohol.

The third compound boils at almost the same temperature as mercury. According to Herr Kraut it would be cinnamic ether of benzylic alcohol, $C_{32} H_{14} O_4$.

Cinnamic Acid. *Ether.*

$$C_{18} H_8 O_4 + C_{14} H_8 O_2 - H_2 O_2 = C_{32} H_{14} O_4.$$

When saponified with alcoholic potash it yields cinnamic acid and benzylic alcohol. Balsam of Peru contains cinnamic acid in a free state and a small quantity of benzoic acid. The author attributes the salts of this last acid and the benzylic acid which is met with to the saponification of benzoate of benzyle.

If the impure essence be saponified (not fractionally distilled) with alcoholic potash, the benzylic alcohol obtained is not pure, but mixed with other matters of a nature not yet determined.

Peru, Balsam of, the Adulteration of. (R. Henning.) The adulteration of balsam of Peru is chiefly effected with fatty oils and copaiba balsam. The colour is heightened by asphalt. Shake the balsam with four times its bulk of pure benzine, cinnamein dissolves with a pure yellow colour; a brown colour shows the presence of asphalt. Evaporate on a watch-glass some of the benzine solution, oily drops of cinnamein remain; copaiva will betray itself by its smell. A few drops of sulphuric acid added to cinnamein give a cherry red colour; copaiva or other resins produce a yellow brown. After some time, violet streaks on a brown ground may be distin-

guished. Pure cinnameïn gives with sulphuric acid a uniform mass; presence of copaiva in balsam causes a bluish skin to form. If three grammes of the questionable balsam be mixed by constant stirring with five grammes of fuming nitric acid, at the end of the reaction there is obtained a brown greasy mixture. This is well mixed up by the pestle with 30·3 grammes of water. If the balsam be pure, the water forms a yellow emulsion, in which small brown lumps of a greasy consistency swim, which after some time unite. Balsam, adulterated with castor oil, leaves the water clear. The mass forms large adhesive pats, the consistency of which, according to the proportion of castor oil, resembles soft or hard salve. The nitrous acid arising from the action of the nitric acid converts the ricinelaic acid of the castor oil into ricinelaidic acid, which, by solidifying, so promotes adhesiveness of the mass, that the formation of an emulsion is prevented. Both tests are so striking, that when they have once been seen side by side, there can be no mistake in the future.

Peru, Oil of. (Cinnameïn.) Cinnamate of benzyl. If Peru balsam be shaken with strong caustic potash, addition of water and digesting hot, separates a slightly coloured oily body; this is washed with water, separated therefrom, and dissolved in spirit. On diluting the spirituous solution, there separates a resin, which is rejected. This alternate solution in spirit and dilution with water, is continued till the oil is free from resin. By gentle evaporation, the alcohol is got rid of, and there remains a colourless, faintly but agreeably smelling oil, heavier than water, which consists of cinnameïn. J. Lehmann has given a good process for the preparation of cinnameïn. A pure petroleum spirit is requisite, which evaporates completely on the water bath without leaving the slightest smell or residue. The balsam is shaken with twice its volume of the petroleum at a temperature not exceeding 60° F.; this agitation is repeated several times, after pauses of ten minutes, and the petroleum solution is decanted. The residue is treated in like manner, with an equal volume of petroleum, the solution allowed to settle for a day, and then distilled at a very gentle heat. The residue, heated for half an hour on the water bath to drive off the last traces of the spirit, is cinnameïn. The yield is about 43 per cent. of the balsam used.

Physostigm. Venenos Spirituos. Extract., Preparation and Properties of. According to J. B. Enz, the Calabar beans with a brown kernel are useless; only those with a white kernel should be used to prepare the extract. They are coarsely powdered in a mortar and poured over with spirit of 0·83 sp. gr.; after 10 days' digestion an

extract of a beautiful red colour is obtained, filter and wash with a small quantity of spirit until the washings are colourless. This liquid by evaporation on the water bath leaves first a red and then a green ring; by further evaporations the colour becomes gradually a dark green.

The extract possessing a beautiful copper green colour in thin layers, was thoroughly redissolved by alcohol. The action of sulphuric acid did not alter the green colour, but addition of a crystal of bichromate of potash, changed the green into a blood-red, which gradually disappeared. On account of the fatty and resinous matter, solution in water gave a turbid dirty green liquid. The filtered solution gave precipitates with iodine dissolved in iodide of potassium, corrosive sublimate, iodide of potassium and mercury, chloride of gold, tannin, and the alkalies.

O. Hesse through his researches has discovered how easily physostigmine is decomposable.

Pickles, Harmless Colouration. Process for giving a harmless green colour to pickles. The vegetables, cucumbers, peas, French beans, etc., are poured over with boiling hot salt water, allowed to stand for a short time, and drained from the salt water. They are next placed in an earthen vessel, and boiling vinegar is poured over them; the vessel is covered and put in a warm place; every third day the vinegar is poured off, just boiled, and again poured over the vegetables. This is repeated till the colour of the vegetables is a fine green; the vinegar is then strained off, and replaced by fresh spiced vinegar; the vessel is then closed. The colour is harmless, although of the same tint as verdigris.

Quinine Sulphate for intercepting Chemical Rays. Professor Morren (*Brit. Assoc. Rep.*, 1869), in studying the reactions recently discovered by Tyndall, has employed a clear solution of quinine sulphate for intercepting the chemical rays of solar light. Between two glass plates a solution of quinine sulphate, well filtered, is confined by means of gutta percha. This screen, which is five millimetres in thickness, transmits the luminous rays freely, but is opaque to the chemical rays. The author thinks that photographers might advantageously employ the quinine solution instead of the yellow glass, which imparts unnatural hues to all objects in the operating chamber.

Ratinhin and its Compounds. Dr. W. H. Ginth states, in the *Sitzungsberichte der kais. Akademie der Wissenschaften* of Vienna, for October, 1869, that he had previously shown that the angelin obtained by Peckolt from the resin of *Ferreira spectabilis* was

identical with the ratanhin from the American mercantile extract of ratanhin. A fresh series of experiments has confirmed this view, and has enabled the author to give the following history of the properties of ratanhin. It is able to combine with facility with the stronger bases. It dissolves easily in ammonia, forming a colourless strongly alkaline liquid; from the hot solution, if no excess of ammonia be present, it separates in small needle-like crystals; compounds were obtained containing 14, 16, and 19 equivalents of ammonia, but were not constant. With potash and soda similar reactions took place, the resulting compounds having the definite composition $C_{10}H_{11}K_{42}NO_3$ and $C_{10}H_{11}Na_2NO_3$; the compound $C_{10}H_{12}KaNO_3$ and the corresponding sodium compound not having been obtained; with baryta and lime $C_{10}H_{11}BaNO_3$ and $C_{10}H_{11}CaNO_3$ resulted. With powerful mineral acids it enters readily into moderately stable combinations, without neutralising their reaction. Compounds with powerful organic acids either do not exist, or are unstable. Dilute nitric acid dissolves it without change; with concentrated nitric acid a strong reaction takes place with evolution of nitrous acid, and a dark yellow or reddish brown solution is obtained, which no doubt contains the same product of decomposition as is obtained by heating or evaporating a nitric solution of ratanhin. The author believes it is not changed into an acid, but into an isomeric substance. In hydrochloric acid it dissolves easily, forming a colourless acid solution; the hydrochloric salt of ratanhin can be separated by means of ether in the form of a white crystalline sediment, bearing the composition $C_{10}H_{13}NO_3 + ClH$. Dilute sulphuric acid dissolves it at the ordinary temperature, more quickly when heated, to a colourless very acid liquid, yielding on evaporation colourless crystals of the sulphur-salt, $C_{10}H_{13}NO_3SO_3H_2O$; concentrated sulphuric acid produces the same compound at ordinary temperatures; at higher temperatures it changes the ratanhin into a mixture of a monobasic and dibasic sulphur salt. Moderately concentrated phosphoric acid dissolves it to a colourless acid solution, which is uncrystallizable except when left to stand for several weeks. The reactions of ratanhin with acids and alkalies seem to the author to show clearly that it belongs to the category of amido-acids.

Resins. In the *Bull. Soc. Pharm.*, 1870, 125, M. Sacc remarks upon the small amount of study that has been expended on this subject, and gives the following information as the result of his own investigations.

Resins greatly resemble coarse solid bodies; the points of difference are, that they do not mark paper, they melt at above 100° C.,

are saponified with difficulty, or not at all, and burn when in contact with an ignited body.

The waxes form the connecting link between the resins and coarse bodies.

The resins under consideration are, copal, amber, dammar, colophony, lac, elémi, sandarac, mastich, and cassauba wax.

The points of each which have been considered are,—friability, the action of boiling water, that of alcohol at 86°, of ether, of ordinary acetic acid, of caustic soda at from 86° to 10° A.B., also boiling, of carbonic sulphide, turpentine, boiling linseed oil, of benzine, oil of naphtha, of sulphuric acid at 66° A.B., nitric acid at 37° A.B., and of caustic ammonia.

All the resins were used in a state of fine powder, and the solvents, the volume of which was three times that of the powder, have reacted on them, unless the contrary be expressed, for 24 hours, at a temperature, which varied from + 15° to + 22° C. The fusion and ebullition always took place in tubes of Bohemian glass over the flame of a spirit lamp.

Copal is light yellow, in large transparent pieces, which bear on the surface the impression of the sand into which they have flowed. It is very fusible, its powder is dry, and melts easily into a perfumed liquid when heated; at the same time vapour of a musky odour is given off, which condenses in the cold parts of the tube into a heavy yellow liquid. In boiling water the powder floats without agglomerating. Alcohol agglomerates without dissolving it. Acetic acid does not act upon it, neither does caustic soda, except to turn it yellow. It swells without dissolving in carbonic sulphide and in turpentine. Boiling linseed oil does not dissolve it. It is insoluble in benzine and oil of naphtha. It dissolves in sulphuric acid, which colours it yellow. Water precipitates it. Nitric acid does not act upon it. Ammonia combines with it with evolution of heat, makes it swell, and ends by effecting its solution. Copal in powder retains this base so strongly that when the combination is heated it becomes gelatinous, without losing its ammonia, even at 100 degrees. It becomes again friable on cooling. Copal, dissolved in sulphuric acid, and precipitated by water or in ammonia, and precipitated by an acid, is as insoluble in turpentine as before, so that it is probable that it is not altered.

Amber is the least changeable of all the resins; it is the least friable, though still so in a very high degree. When heated, it blackens, puffs up while melting, and yields a heavy brown oil, whose odour recalls that of camphor and turpentine. Boiling water does

not act upon it, neither does alcohol, ether, acetic acid, caustic soda, carbonic sulphide, turpentine, boiling linseed oil, benzine, nor oil of naphtha. Sulphuric acid blackens and partially dissolves it. Nitric acid and ammonia do not act upon it.

Dammar is excessively friable; when heated it easily melts into a colourless liquid, agglomerates in boiling water, does not dissolve in alcohol, dissolves in ether. It is insoluble in acetic acid and in caustic soda; soluble in carbonic sulphide, turpentine, and boiling linseed oil; very soluble in benzine and oil of naphtha. Sulphuric acid immediately colours the powder a magnificent blood-red, and dissolves it; nitric acid and ammonia do not act upon it.

Colophony is light-coloured and very pure; it is tolerably friable, and easily melts when heated into a light yellow liquid. Boiling water agglomerates it into a half melted paste; it is the most fusible of all resins. It dissolves in alcohol and in ether. Acetic acid swells without dissolving it; it dissolves slowly in boiling caustic soda, and instantly in benzine; it is slightly soluble in oil of naphtha. Sulphuric acid dissolves it, colouring it a dark bright orange. Nitric acid does not act upon it. Ammonia dissolves it easily.

Lac is in light-coloured scales, it retains traces of a red colouring matter, and is crushed by the pestle with difficulty, because the scales slip one upon the other. They are very friable when taken singly. When heated it melts with tolerable ease, puffing up a little, and emits a sweet scent something like that of vanilla. It agglomerates in boiling water. Soluble in alcohol, but dissolves neither in ether nor in acetic acid. It dissolves very easily in caustic soda, which it colours violet. Insoluble in carbonic sulphide and turpentine, slightly soluble in boiling linseed oil; insoluble in benzine and oil of naphtha. Sulphuric acid dissolves it slowly, colouring it a dark brown. Although nitric acid does not act upon it, it slightly lightens the colour, no doubt because it destroys its red colouring matter. It is insoluble in ammonia.

Elémi is very friable, and when heated puffs up and melts. In boiling water it agglomerates without melting; slightly soluble in alcohol; very soluble in ether; insoluble in acetic acid and caustic soda; slightly soluble in carbonic sulphide; soluble in turpentine; slightly soluble in boiling linseed oil, benzine, and oil of naphtha. Sulphuric acid dissolves it, colouring it a dark bistre; nitric acid colours it a dirty yellow, without dissolving it; and ammonia does not act upon it.

Sandarac is friable and melts, puffing up very much; it does not agglomerate in boiling water. Soluble in alcohol; very soluble

in ether; it does not dissolve in acetic acid or caustic soda. Slightly soluble in hydrique sulphide; soluble in turpentine; slightly soluble in boiling linseed oil, benzine, and oil of naphtha. Sulphuric acid dissolves it, colouring it a dark brown. Nitric acid colours it light brown without dissolving it. Ammonia first swells, then dissolves it.

Mastich is friable, puffs up while melting, and agglomerates in boiling water. It is soluble in alcohol, very soluble in ether; insoluble in acetic acid and caustic soda. Slightly soluble in carbonic sulphide; very soluble in turpentine; soluble in boiling linseed oil; very soluble in benzine and oil of naphtha. Sulphuric acid dissolves it, colouring it a dark reddish brown. Nitric acid colours it light brown without dissolving it. Ammonia first swells then dissolves it.

Cassauba Wax is friable, and melts without puffing up when heated; it melts also in boiling water. Slightly soluble in alcohol and ether; insoluble in acetic acid and caustic soda; slightly soluble in carbonic sulphide; soluble in turpentine; insoluble in boiling linseed oil; soluble in benzine; slightly soluble in oil of naphtha. Sulphuric acid colours it light brown without dissolving it. Nitric acid does not dissolve, but colours it straw colour. Ammonia does not act upon it.

Rubia Tinctorum.—New Tinctorial Substance from the Madder-root. Professor Rochleder of Prague states that the root of the madder (*Rubia tinctorum*) treated with dilute mineral acids, yields besides alizarine and purpurine, a very small proportion of a third substance, closely allied by its composition to the two first. The colour of its alkaline solution is almost the same as that of the alkaline solution of chrysophanic acid; acids precipitate it in the form of gelatinous perfectly amorphous flocci, of a very pale yellow colour. It crystallizes from its alcoholic solution in orange-yellow needles, and from its solution in acetic acid in lemon-yellow needles. The aqueous solution, to which acetic acid has been added and boiled in contact with silk or wool, communicates a durable tint of a beautiful golden-yellow colour.—*Cosmos*, July 9th, 1869.

Sal Epsom, Masking the Nauseous Taste of. (Isaac W. Smith, Philadelphia.)

℞ Rad. Glycyrrh. Decort. Cont. . . . . ʒiv.
Aq. Bullient. . . . . Oij. vel q. s.

Mix, and allow to stand, with occasional stirring, until cold; then

express through muslin, adding more water if necessary, until the residue no longer tastes; then filter. To the filtrate add

Magnesiæ Sulphat . . . . . ℥iv.

and evaporate to dryness over a water bath. Each ounce of the compound represents about one ounce of the crystallized salt.

Silicate of Soda as a Solvent of Coralline. By C. Puscher. According as more or less coralline (an aniline dye insoluble in water) is added to a boiling solution of 1 part of syrupy silicate of soda diluted with 4 parts of water, there is produced a solution varying in tint from a lovely rose colour to a most magnificent carmine red, which is suitable for staining wall-paper, for illuminating, making artificial flowers, and a variety of other purposes.

Succini Oleum verum. The difficulty with regard to this distillate centres in the expression "*en ménageant le feu*"—the regulation of the heat.

Three kinds of retort have been recommended: the first of iron, which seems inadmissible,—the metal rapidly absorbs and retains its heat; and though this inconvenience may be overcome, iron does not appear adapted to the purpose.

The same objection applies also to the "*cornue de grès*" the earthenware retort, though the egg-shape in which the latter is usually made is much in its favour; there is besides the drawback, existing in both cases, of not seeing the exact condition of the amber when it begins to melt. No sooner is heat applied from any source than the amber begins to swell in a formidable manner, and in one so variable that no two samples are alike. Many expedients have been suggested in order that this may be prevented; equal parts of sand and amber is a favourite remedy, but one not likely to be adopted by those desirous of obtaining after-products.

The whole care of the operator should be directed to the management of the fire, urging it on, or checking it, so as the most speedily, yet with safety to the process, to melt the *entire* contents of the retort. Once let this point be gained, and the oil may be distilled over to the last drop;—till then the dense thick vapours and the swelling up have to be carefully watched, while the rapidly formed succinic acid has to be as speedily removed, else the neck of the retort may be choked, and the unchecked violent action of the amber may end in a catastrophe. A glass retort, of a prolonged egg-shape, capacity not less than ten gallons, with a short wide neck—neck with no ledge—and the glass without a flaw, is the apparatus to be selected. The ledge just mentioned is objectionable as it forms a

resting place for the succinic acid, rendering it difficult to be removed, and thereby endangering the commencement of the process.

The source of heat is of some importance. The Codex wisely described it by the indefinite word "*le feu.*" In one published account there is a statement that glass not being able to support the heat required, an earthenware retort on a sand bath should be employed. This is a combination well qualified to determine failure :—a retort into which you cannot see, and a heat which you cannot regulate. While having myself without accident used glass days together while distilling amber, the theory respecting its essential inadaptability may be called in question. At present the water bath seems the most manageable source of heat.

Judging from the Codex, we might imagine that the whole of the succinic acid was first produced, and in due course the oil; but in practice, owing to the heat required to melt the entire mass of amber (a thing of the last importance), the three products—acid liquor, succinic acid, and the oil—rise simultaneously, while a yellow powder called succinite is deposited in the neck of the retort. The two first are used in French pharmacy, and the oil is utilized on both sides of the channel. Abroad it enters into the composition of the baume de Fioravanti, eau de luce, sirop de Karabé, and other preparations.

The average yield of oil from amber is very differently stated. A skilful operator should obtain not less than 28 per cent. This distillate once seen and smelt can never be mistaken for another. Treated with nitric acid, in proportions given in works on Materia Medica, the substance termed artificial musk is formed, which owes its peculiar flavour to the presence of acetic, propionic, and butyric acids. This should be kept under water;—when required for use, the acid liquor should be poured off, and hot water added. The mass, however seemingly deteriorated by keeping, melts together, every particle is recovered, and on being *pulled* will assume various shades of colour, rivalling the most exquisite of the yellow aniline dyes. Artificial musk dissolved in rectified spirit, according to recognised printed formulæ, is invaluable in its special therapeutical application.

A black, shiny, bituminous residue is left after distillation at the bottom of the retort, which, when dissolved in chloroform, furnishes photographic varnish. This residue should be removed while still hot, and the operator should be cautioned not to place fresh amber, nor to commence a second distillation on the remains of a previous make.

Unequal expansion by heat is a fertile source of accident, against

which it is difficult to guard. One direction of the Codex as far as we manufacturing English are concerned, should be disregarded,—the rectification of the oil by subsequent distillation. Its physical characters are by this means altered; a lighter, red-grape purple oil is produced, its peculiar characteristic smell is partially destroyed, and the yield of artificial musk is diminished; while the oil becomes unsaleable as a commercial article. The crude unrectified oil, carefully separated from the acid liquor and the succinic acid is oleum succini verum.

Tartaric Acid as Tartrate of Lime, on the Determination of. (T. F. Martenson.) Determinations of the solubility of tartrate of lime showed that one part of the salt is dissolved by 2388 times its weight of water; alcohol of 85 per cent. dissolves only the merest traces. To estimate the tartaric acid in, for instance, the potash salt, the salt after drying at 100° C. is dissolved in water in a small porcelain basin, which is free from scratches and well glazed. Chloride of calcium is added, together with a few drops of lime water, avoiding excess of the chloride; stir without allowing the glass rod to touch the sides, and set aside for some hours. The precipitate is crystalline.

The liquid is then poured off into a weighed filter, and allowed to run through; the precipitate is added by washing it on to the filter with alcohol; continue the washing three or four times with spirit of 80 to 85 per cent.; the crystalline character of the precipitate facilitates this. Dry at 100° C., and weigh as $C_4 H_4 Ca'' O_6 + 4 H_2 O$. At 100° C. tartrate of lime loses no water. It is soluble to some extent in solutions of sal-ammoniac and chloride of calcium.

Thymol, a New Disinfectant. As a new disinfectant, M. Paquet proposes the use of thymol, the stearopten of the essential oil from *Ptychotis ajowan*, an umbelliferous plant growing in India. In the undiluted state this substance is a caustic, and is used in dentistry for the cauterising of hollow teeth. Its advantage in this respect being that it has no unpleasant taste, and, being very aromatic, does not effect the breath as carbolic acid does. Its aqueous solution is a strong antiseptic, and possesses disinfectant properties in a very high degree.—*Quarterly Journal of Science*, April, 1870. A very beautiful specimen of thymol was shown at the Liverpool Pharmaceutical Conference by Mr. Henry Sugden Evans.

Waterproofing, New Process for rendering Vegetable Woven Fabrics and Paper Waterproof. Vegetable materials, such as paper, dissolve in an ammoniacal copper solution. If two surfaces be softened only, by steeping in the solution for about half-a-minute,

and then pressed together by passing between rollers, they unite and form a single sheet of such a nature as to be impervious to moisture. —*Polyt. Notizbl.*

Zinc, Phosphide of, on the Preparation of. By Proust. Herr Vigier prepared phosphide of zinc for therapeutic purposes according to the process of Dulong: that is to say, by heating zinc and phosphorus together in a current of hydrogen. This method has the disadvantage of the great risk of frightful explosions. The author prepares phosphide of zinc by passing phosphuretted hydrogen over zinc heated to redness in a tube of porcelain. The apparatus made use of consists of three vessels and a porcelain tube, which communicate with each other by means of glass and caoutchouc tubes. The first vessel is a flask in which nitrogen is evolved by heating nitrite of ammonia. The two other vessels are both three-necked bottles, into the first is put water and hydrochloric acid, into which mixture there dips a wide tube, by which phosphide of calcium is introduced. Phosphuretted hydrogen is thus evolved. The nitrogen passing through the bottle carries the phosphuretted gas with it through a wash bottle, and into a porcelain tube; here it passes over a red-hot boat filled with zinc. The phosphuretted hydrogen gives up its phosphorus to the metal, while nitrogen and hydrogen escape from the tube. It is well to close one end of the tube with a wide-necked flask, in order to control the reaction, and regulate the temperature.—*Hager's Centralhalle.*

PHYSIOLOGICAL AND PATHOLOGICAL CHEMISTRY.

Action, Physiological, of Homologous Compounds. Dr. B. W. Richardson, in his last report to the British Association on the Physiological Action of Organic Compounds, arranges in chemical series the agents recently studied, and considers the distinctive characteristics of the different groups. The arrangement adopted may be thus indicated:—

	Hydrides.	*Nitrites.*	*Alcohols.*	*Chlorides.*	*Iodides.*
Methyl .	$CH_3.H$	$CH_3.NO_2$	$CH_3.HO$	$CH_3.Cl$	$CH_3.I$
Ethyl .	$C_2H_5.H$	$C_2H_5.NO_2$	$C_2H_5.HO$	$C_2H_5.Cl$	$C_2H_5.I$
Butyl .	$C_4H_9.H$	$C_4H_9.NO_2$	$C_4H_9.HO$	$C_4H_9.Cl$	$C_4H_9.I$
Amyl .	$C_5H_{11}.H$	$C_5H_{11}.NO_2$	$C_5H_{11}.HO$	$C_5H_{11}.Cl$	$C_5H_{11}.I$

The tricarbon or propyl compounds are passed over owing to the difficulty of obtaining trustworthy specimens. The general results

of the author's minute and laborious investigation are here epitomised :—

Hydrides.—The first and the last of the hydrides tabulated have been studied with regard to their physiological action. Methyl hydride or marsh gas, the fire-damp of mines, when inhaled, only slightly diluted with air, rapidly produces anæsthesia without excitement, and, if the inhalation be stopped in time, a few seconds are sufficient for the restoration of full consciousness and muscular power. The vapour of amyl hydride, an extremely volatile liquid, acts in the same manner as marsh-gas but with greater power. As an anæsthetic for short surgical operations, this hydride would doubtless prove effective. The hydrides being stable chemical compounds, insoluble in the blood, and free from irritating properties, may be inhaled for a short time without injury to the animal economy. The insensibility produced is transitory, and an attempt to prolong it by the continuous administration of the gas or vapour would quickly lead to death from suffocation.

Nitrites.—The study of the four nitrites tabulated has revealed a beautiful relation between chemical constitution and physiological action. They all act in the same way, but with increasing power corresponding to the increasing weight of carbon in the series. They act primarily on the nervous system of organic life, and by weakening the control of that system, they reduce the vascular tension. The chief symptoms of their influence are flushing, intense action of the heart, followed by quickened respiration, and free secretion of organs governed by the organic nervous centres. Their therapeutic value is manifested in the successful treatment of angina pectoris by inhalations of amyl nitrite, and in the general use of ethyl nitrite or nitrous ether as a diuretic.

Alcohols.—These compounds act on the organic and cerebro-spinal centres. They produce temporary excitement, but their general action is to reduce animal heat and power. Their extreme influence on the cerebral hemispheres is manifested by a complete deprivation of consciousness. The functions of the heart and diaphragm, those upon which the continuance of mere animal life depends, are very slowly affected by these agents. But for this peculiarity of action, in the case of ordinary alcohol, every deeply intoxicated man would die. The alcohols are true anæsthetics, but for the purposes of the surgeon their action is too slow, and the anæsthesia produced too prolonged. In physiological action, as in chemical constitution, the alcohols exhibit gradational differences. In passing from the lighter to the heavier compounds, the differences

observable tend towards slowness and persistency of action. In the inferior animals methyl and ethyl alcohols never produce those remors which are recognised in man, while butyl and amyl alcohols most effectively call them forth. The author thinks it possible that *delirium tremens* in the human subject, may be caused by the heavier alcohols with which ordinary spirituous liquors are so largely contaminated. To these heavier alcohols he also traces the continued coldness, lassitude, and depression following a dinner with bad wine.

Chlorides.—These are simple and pure anæsthetics. Their power increases proportionately as the weight of carbon increases. They act most readily and determinately on the cerebrum, and on the centres of volition and common sensibility. They have little action on the organic nervous system, and they interfere, even in full doses, but very gradually with the movements of the heart and the respiratory organs. Butyl and amyl chlorides, will doubtless prove valuable medicinal agents, as they admit of being applied in many cases where prolonged sleep is required.

Iodides.—The substitution of iodine for chlorine, induces evident difference of physiological action. These organic iodides, like the corresponding chlorides, produce insensibility, but they have also a special action on glandular structure. As their influence is both eliminatory and anodyne, they promise to be of great service in medicine.—*Brit. Assoc. Rep.*

Amyl Hydride as a Medicinal Agent. Dr. B. W. Richardson (*Brit. Assoc. Rep.*, 1869.) thinks that amyl hydride is destined to become as common an agent in medicine as ammonia or ether or alcohol. This hydrocarbon is prepared in the chemical laboratory by a costly and troublesome process, but a product sufficiently pure for most medicinal purposes may be readily obtained from American petroleum, by fractional distillation. It is a colourless very volatile liquid, boiling at 30°C. (=86°F.), a temperature nearly seven degrees centigrade below the natural temperature of the human body. Its extreme volatility renders it a useful agent for the production of local insensibility. For mere punctures or slight incisions, the simple hydride, in the form of spray, rapidly produces the effect needed; but when comparatively large surfaces have to be deadened, the hydride should be diluted with absolute ether. The best agent for the rapid production of local insensibility is thus secured.

Amyl hydride dissolves camphor and spermaceti, and mixes with vegetable and animal oils. These properties have been turned to account in the preparation of a solution for relieving the pain of burns. The hydride is first saturated with spermaceti and then

with camphor, and the resulting compound solution is mixed with an equal bulk of olive oil. When this preparation is applied on wool over a burned surface, the cold produced by the rapid evaporation of the hydride gives instant relief, while the thin layer of fatty matter left behind effectually excludes air and greatly promotes healing.

The hydride also dissolves iodine, forming a most valuable solution. When this is applied to the skin the solvent passes away at once, and an even coating of iodine is left. The deodorising power of iodine may be readily utilised by suspending in the air pieces of cloth that have been drenched with the solution. For iodine inhalation this solution, properly diluted, may be employed with advantage.

Another useful liquid is obtained by agitating the hydride with strong solution of ammonia, allowing the mixture to stand for some time, and then decanting the lighter portion. This ammoniated hydride has remarkable antiseptic properties, and can be used by the anatomist for the preservation of fresh animal structures in closed jars. By adding camphor to it the student of natural history obtains a good preservative for his specimens. The inhalation of the ammoniated hydride may be prescribed by the physician in cases where he wishes to administer ammonia rapidly.

Cicuta Virosa. The Poisonous Principle of Water-hemlock. M. A. H. Van Aukum states that cicutene, the oil derived from the *Cicuta*, dissolves sulphur and phosphorus like the oil of turpentine. The researches on the rotatory power of cicutene on the plane of polarization show a rotation to the right equal to that which a plate of quartz 1·42 mm. in thickness exercises. The author's investigations do not show the presence of a volatile alkaloid, cicutine, in the root of the *Cicuta*, as stated in the text-books. He tried in vain to extract such an alkaloid by digesting with alcohol and ether. It is extremely difficult to obtain the poisonous principle in a state of chemical purity; it appears, however, to possess chemically neutral properties.—*Archives Neérlandaises des Sciences Exactes et Naturelles*, tome xiii., 5me livraison.

Coal Gas, Action of, on Vegetation. The researches of Dr. Freytag, of Bonn, on this subject, show that neither hydrogen nor carburetted hydrogens, such as olefiant gas, marsh gas, etc., were injurious to vegetation when passed through the soil; but that the injurious effects of coal gas were due to the condensation by the soil of certain constituents, naphthaline, benzole, etc., which were poisonous to the roots of the plants.

Curare Poison on Dogs. M. Bert records in the *Archives de Physiologie* for 1869, No. 5, a series of experiments on this subject. 6 centigrammes of curare in the solid state, and 6 centigrammes dissolved in 6 grammes of water, were introduced beneath the skin of a healthy dog of medium size. In a few minutes it reeled on its fore paws, walking on its claws, and then fell, exhibiting all the symptoms of curare-poisoning, venting a small quantity of excrement and urine, and emitting much saliva, and a copious flood of tears. The trachea was opened, and a regular artificial respiration induced, which was maintained for ten hours. The pneumo-gastric nerve on the right side was exposed and tied, as well as the sciatic nerve. After a few minutes the sciatic nerve no longer acted on the muscles. The pupil of the eye on the right side was contracted; that on the left side very much dilated; galvanisation of the pneumo-gastric sympathetic of the neck, on either side, induced the dilatation and projection of the eye; galvanisation of the pneumo-gastric nerve, on either side, entirely arrested the action of the heart; the iris on the left side contracted under the influence of light. Galvanic excitation of the cerebral end of the tied sciatic nerve, of the median nerve, of the sub-orbital nerve, induced contraction of the bladder, shown by the rejection of a small quantity of urine. This effect is obtained only through the nerves of sensibility belonging to animal life; neither the pneumo-gastric, nor the sympathetic of the neck, nor the visceral gave anything of the kind. After ten hours of artificial respiration, the temperature of the animal was reduced by 3° or 4° C. The urine contained in the bladder, together with that which had been collected before, contained abundance of sugar.

Curare Analogues. Buchheim and Loos (Eckhard's *Beiträge zur Anatomie und Physiologie*, vol. v., p. 179.) have investigated the toxic effects of a large series of substances resembling curare in their action on the animal body. Some of these were already well known by the researches of Brown and Fraser, others not. The following table gives the dose (in grammes) of each substance sufficient to produce incomplete and complete paralysis of the motor nerves of a frog. B. and L. remark that all these bodies, so far as their composition is known, are ammonium bases. The echium and anchusa extract were made by Stas' process. The authors were led to investigate these extracts through Diedülin's results from cynoglossum. From cynoglossum itself they got, by the same method with great difficulty, an amorphous hygroscopic substance which also acted like curare, but possessed extremely little energy.

	Appearance of decided paralysis in hind limbs.	*Cessation of all voluntary movement.*	*Cessation of reflex actions.*
Curarin	·0000025	·000005	·000008
Curare	·000025	·00005	·00008
Methyl-delphinin sulphate	·0001	·00025	·0005
Methyl-delphinin	·00016	·00025	·0005
Methyl-strychin sulphate	—	·0005	·0008
Methyl-atropin iodate	·0005	—	·001
Methyl-chinidin iodate	·00055	·0008	·0016
Ethyl-strychin sulphate	·0005	·0016	·0025
Ethyl-brucin sulphate.	·0008	·0016	·0025
Methyl-brucin iodate	·0008	·0016	·0025
Methyl-chinin sulphate	·0008	·0016	·0025
Methyl-cinchonin sulphate	·0008	·0016	·0025
Amyl-cinchonin iodate	·0025	—	·005
Cotarnin	·0016	·005	·0075
Amyl-veratrin	—	·0025	—
Methyl-veratrin	—	·005	·01
Methyl-nicotin sulphate	—	·033	·1
Methyl-nicotin iodate	—	·05	—
Ethyl-nicotin iodate	—	—	·15
Ethyl-nicotin sulphate	—	—	·2 or less
Echium extract	—	—	·125
Anchusa extract	—	—	·25

Haschish, the Antidote for. Professor Polli, of Milan. (*The Medical Press and Circular*, vol. viii., p. 494.) Prof. Polli states, that to accelerate the action of haschish, it should be administered in infusions of coffee, tea, or cocoa, as experience has proved that these infusions always increase its effect; on the contrary, citric, malic, acetic, and tartaric acids, arrest the effects of haschish; solutions of these acids are therefore competent to serve as real antidotes. He states that the information is derived from the Egyptians, and from the testimony of Dr. Castelnuovo, who resided for some time at Tunis, "where he convinced himself of the antidote value of lemon-juice and strong lemonades against haschish."

Hyoscyamine and Daturine studied with Respect to their Physiological Action. MM. Oulmont and Laurent detail in the *Archives de Physiologie*, 1870, No. 3, a long series of experiments on this subject, from which they draw the following conclusions:—1. Hyoscyamine and daturine exercise their functions specially on the system of the great sympathetic. 2. In weak doses they diminish the capillary circulation; in strong doses they determine a vascular paralysis. 3. The arterial tension is increased by the administration of weak doses; on the contrary, it is diminished by poisonous doses. These results are not modified by cutting the pneumo-gastric nerves. 4.

The number of pulsations is increased, and their strength decreased. 5. Hyoscyamine has a regulating effect on the movements of the heart; daturine often produces intermittent action; when carried direct to that organ, these alkaloids diminish the frequency of the pulsations, and ultimately produce a complete stoppage. 6. They always accelerate the respiration. 7. Sensibility and power of motion are not modified; in poisonous doses the external sensibility is dulled. 8. They have no action on the excitability of the muscles with striated fibre, nor do they modify their structure. 9. In weak doses they accelerate the movements of the intestines; in strong doses they paralyse them. 10. The general phenomena which are observed in their administration are due to the modifications which take place in the circulation. They disappear rapidly, becoming quickly eliminated, especially by the urine, in which they are to be found. 11. The dilatation of the pupil of the eye is due to the excitation of the great sympathetic. 12. Weak doses generally produce a slight augmentation of temperature; strong doses diminish the general temperature.

Maltine. The Artificial Digestion of Starchy Substances. By Dr. L. Coutaret. By means of maltine or diastase, which is obtained by macerating barley malt in lukewarm water, a very remarkable digestion of all kinds of amylaceous food, when cooked by boiling, may be effected. This artificial digestion, after the course of less than an hour, yields a milky liquid, which consists of undigested starch, dextrine, and glucose, and the resulting large quantity of the last substance renders it easy of recognition by the usual reactions. The following are the chief facts which have been observed regarding this artificial digestion :—

1. Previous thorough boiling of the substance for digestion is indispensably necessary.

2. Maltine is the more active the nearer it is to its original state in the process of vegetation.

3. The presence of water is absolutely necessary for artificial digestion; and the boiled amylaceous food must be diluted with about 10 times its weight of water, in order that a normal formation of sugar may ensue.

4. The solvent action of the maltine on starchy matters differs with nature of the starch; one gramme of maltine can generally effect the digestion of 1800 to 2000 grammes of boiled starch. Each kind of starch requires the presence of a different quantity of water, and a greater or less duration of the reaction, if every kind of starch should give a like result.

5. The temperature most suitable is from 35° to 40° C.

6. The saccharising action of maltine on starch is absolutely identical with that of the ptyaline of the saliva; moreover, the two kinds of diastase, the vegetable and the animal, exhibit the same physical, chemical, and physiological properties. Acting on the same quantities, they manifest the same solvent power for boiled starchy matter. Strictly speaking, there is but one kind of diastase for both the vegetable and the animal kingdoms; and it may be asserted, without hesitation, that maltine is a true artificial saliva, a vegetable ptyaline. Hence the uncommon importance that maltine may attain in the treatment of dyspepsia (enfeebled digestion).

The author states, that for six years he has used maltine as a remedy in every-day practice; in many cases with truly surprising results. Besides necessary diet and alkaline waters, there is no remedy which, in the same proportion, possesses such harmlessness and such healing powers.—*N. Jahrb.*, 1 *Ph.; Hager's Centralhalle.*

Nitrogen, Protoxide of, as an Anæsthetic. M. Jeannel, Professor of Pharmacy and Materia Medica, of Bordeaux, has brought forward a memoir on protoxide of nitrogen. The author's conclusions are thus noticed by the Paris correspondent of the *Lancet*:—

1. The purified gas, such as is employed at present, does not produce those exhilarating effects which have been described by authors of the commencement of this century.

2. Anæsthesia produced by protoxide of nitrogen, is not so complete as that brought on by chloroform; but it differs essentially therefrom by the rapidity of invasion, the absence of excitement at the outset, and the facility with which one returns to the normal condition. It produces also a more decided kind of asphyxia.

3. It is of convenient application to operations of a short duration; and it is probable that the agent may be applied to the more imporant surgical operations, by preserving a suitable interval between the inhalations.

4. We are justified in saying that protoxide of nitrogen exposes less than chloroform to a fatal accident, but occasionally it exerts a deleterious action; it therefore should be exclusively kept in reserve for operations where danger is increased by pain. The use of the gas should be practised with all suitable guarantee and scientific precaution.

Phenyl Group, the Poisonous Properties of some of the Chemical Products belonging to the. (By F. Guyot.) The author's researches led him to the following conclusions:—

1. Phenic or carbolic acid acts on the skin and causes injuries characterised by inflammation and swelling.

2. It acts at a low temperature slowly, but the more quickly and violently the higher the temperature.

3. Pure rosolic acid and coralline are not poisonous, and have besides no action on the epidermis. In the impure state both are poisonous.

4. Rosolic acid may act on the epidermis by reason of some contained substance, either sulphuric acid or rosol, according to its method of preparation.

5. The coralline, prepared from impure rosolic acid and excess of ammonia, is poisonous when absorbed by the animal system; it acts then by reason of the aniline contained in it; on the skin, however, it is harmless.

6. Coralline prepared as in the two before-named cases, acts on the skin by reason of its containing phenol.

7. Impure and hurtful rosolic acid can be purified by benzol.

Steam under High Pressure, the Therapeutical Effects of. By William Bennett, M.D., Harrogate. (*The Medical Press and Circular*, vol. viii., p. 72). The author having met with a case of extensive ulceration of the inner surface of the right thigh, in the treatment of which he believed that a stimulating application was required, conceived the idea of employing steam, knowing that when used under high pressure, he "had the command of a very great quantity of electricity, not of very high tension, which by proper management and regulation of the pressure," would supply a stimulant very different from any that had been used before. He states that, "in using the term steam or vapour douche, I must not be understood to mean a jet of steam forced through a simple tube, for in that case the steam itself, when pure, has nothing to do with the phenomenon of electricity; this latter is manifested only when water is at the same time present, and is altogether the effect of the friction of the globules of water against the sides of the substance opposed to its passage, as the water is rapidly moved on by the current of steam. Accordingly the electricity is found to be increased in quantity by increasing the pressure and impelling force of the steam."

The electricity of the steam or water being positive, and that of the opposing solid negative, Dr. Bennett's object was to utilize the resulting current of electricity with the accompanying heat and moisture by insulating the patient and the generator of the steam. He does not describe the method employed, but he states that he has applied the vapour douche in cases of ulceration of the lower extremities with marked success. In some of these cases he had no doubt of the existence of a syphilitic taint. Also in elephantiasis;

in one of these cases, the author states, "there were fifteen small ulcers, the healing process set in, and the leg was reduced by five inches in circumference: an effect which, I think, could not be procured by any other means."

Strychnine, on the Action of, in Frogs. M. A. Vulpian states that strychnine does not act as a poison either to the motor nerve fibre nor to the sensitive nerve fibre; and that curare is also poisonous to either of these nerve fibres. The study of the action of these two poisons furnishes nothing to establish any real difference between the physiological properties of the motor nerve fibres and those of the sensitive nerve fibres.—*Archives de Physiologie*, 1870, No. 1.

Sulpho Carbolates in Medicine. (*Brit. Med. Journ.*) At the Obstetrical Society, Dr. A. E. Sansom described the action of these salts in the diseases of children. Sulpho carbolic acid unites with basic oxides of the metals to form compounds remarkable for beauty, stability, and solubility. Of these Dr. Sansom has procured those of sodium, potassium, magnesium, calcium, iron, copper, and zinc. A simple test for these salts is found in the addition of solution of perchloride of iron, which strikes a ruby or violet tint if they be present. Dr. Sansom has, he says, met with much success in the treatment of sloughing sore throats, malignant scarlatina, and quinsy, by the sulpho carbolate of sodium; and has used the calcium salt (which is one of the most soluble known) in rickets, and the pretubercular stage of phthisis, and also in the diarrhœa of tubercular children, with uniformly good results in doses of three to five grains or more. He has given a drachm of the sodium salt to an adult, and believes that the sulphuric acid and soda are eliminated by the kidneys, and the carbolic acid by the lungs.

The Therapeutics of Hooping-cough. By H. J. Scheen, M.D. In 1867, Poulet, who has made the infusoria his study, communicated to the Paris Academy, that in researches on mucus from hooping-cough he had discovered a specific microscopic organism (*un veritable monde des petits infusoires*). Prompted by this notice, Jansen (*Diss. inaug. Bonn*, 1867) also examined the mucus from a child with hooping-cough, and also found bacterian-like animalcules. In 1868 the author continued this work, and recognised the animalcules as the *Chilomona sparamecium* of Ehrenberg, although somewhat smaller. From observations on some sixty cases at different times and in various places, and the invariable occurrence of these infusoria, he believes the principle cause of hooping-cough

to be a contagium animatum. The treatment suggests itself. Only such substances are remedies which kill parasites: these are corrosive sublimate, arsenic, and quinine (*Binz, Klinische Studien und Experiment, Unters zu Chinin*, Berlin.) The two first of these three remedies are not applicable to children; there remains then only quinine. The author was delighted to find that here theory and practice corresponded, he having effected fifty recoveries by quinine in the proportionately short time of five to twenty-one days. Hydrochlorate of quinine is preferred to sulphate; for children up to the age of two years, citrate of quinoidine is used.

CHEMICAL ANALYSIS, MANIPULATION, AND APPARATUS.

Apparatus for Preparing Nitrous Oxide Gas. By J. T. Porter. Since the introduction to the medical profession of nitrous oxide gas as an anæsthetic for operations in dentistry, its administration has received considerable attention from surgeons and dentists, and has also occupied the study of physiologists. Many experiments have been made to effect an easy and safe process for its production in a pure state. It may scarcely be necessary to observe that although nitrous oxide can be produced by acting upon zinc with a mixture of dilute nitric and sulphuric acids, it may conveniently, and is more commonly obtained in a purer state by heating nitrate of ammonia to a temperature of about 400° Fahr., when the salt is decomposed into water, and a gas composed of two of nitrogen and one of oxygen combining to form two volumes of nitrous oxide (N_2O) or laughing gas. In this way it was discovered by Priestley in 1776. Its properties and stimulating effects produced by its inhalation were fully investigated by Sir H. Davy in 1800. However, I shall not give its history, as it has already appeared in the *Pharmaceutical Journal*, vols. ix. and x., also in the Journal of the Transactions of the Odontological, Medico-Chirurgical, and other Societies. The following is an account of an improved method of obtaining it in a pure state, together with a description of an apparatus contrived to regulate the heat in its preparation.

From the first use of this gas in England for anæsthetic purposes, rather more than a year since, namely, April, 1868, it has been

my duty almost daily to make large quantities of it for the dental and other hospitals, and unavoidably many accidents have occurred, resulting in devising as many improvements, both in manipulation and apparatus, to prevent their recurrence. Having at last arrived at a period when breakages arising from over-heat or pressure are rare, together with a greater reliance in the purity of the gas, I now bring to the notice of chemists and dentists the result of my experience in the form of the following directions :—

In preparing nitrous oxide from comparatively pure nitrate of ammonia there are three important points to be observed, viz :—

First. To keep the temperature steady, such as will decompose the salt into water and nitrous oxide only.

Secondly. To free the gas from impurities by well washing through proper solutions; and

Thirdly. To be careful in expelling the air from the flask and wash bottles before collecting the gas.

The necessary articles are—

Pure nitrate of ammonia.

A good Bohemian glass flask of suitable size and shape.

Four wash-bottles and tubing.

Water and solutions of caustic potash, and protosulphate of iron.

And lastly a lamp (gas or otherwise) having some appliance that will regulate the heat in proportion to the rate at which the gas is liberated.

Nitrate of ammonia is made almost entirely by neutralizing pure carbonate of ammonia with pure nitric acid, and in this way a pure and comparatively cheap article is obtained. If, however, the ammonia contains any chlorides, or the nitric acid traces of sulphuric or hydrochloric acids, the salt will contain chlorides and sulphates, and when heated will give off chlorine and nitric oxide gases. These are the only impurities that occur, so that a salt containing neither of these may invariably be considered pure.

Arsenic, on the Testing of Wall-papers and Fabrics for. Puscher's test which has been recommended as a ready and simple one, consists in dissolving the colour in sal ammoniac solution, and leaving a few drops to dry on well-glazed paper; after evaporation, a colour containing arsenic remains grass-green, but harmless colours a blue, blue-green, or brown tint. The test is however quite untrustworthy, as many harmless colours remain green after solution in the sal ammoniac. The best test is that of Bettendorf:—Pour over the paper, muslin, or other substance containing the colour, enough hydrochloric acid of 25 per cent., so that after 15 or 30 minutes

digestion, about 20 drops of clear solution may be poured off. Should the solution be turbid and dark, more acid must be added, and the extract must be filtered. Pour 20 drops into a wide test tube, into which has been put a pinch of common salt and stannous chloride; add cautiously, but quickly, pure concentrated sulphuric acid, in quantity twice the volume of the mixture: it quickly grows hot, and evolves hydrochloric acid fumes. As soon as the first violence of the reaction is over, add pure hydrochloric acid: if arsenic be present, the liquid becomes dark grey brown, or brown and turbid, the precipitate settles down, leaving a clear solution.

Arsenic, Test for, with or without the Presence of Antimony. On a new re-agent for Arsenic, and the preparation of Hydrochloric Acid, pure from Arsenic. By Dr. A. Bettendorf. If arsenious or arsenic acid be dissolved in fuming hydrochloric acid, and a solution of protochloride of tin be added thereto, a voluminous brown precipitate rapidly settles. This is filtered off, washed with hydrochloric acid and then with water, pressed between bibulous paper, and dried in vacuo over sulphuric acid. A grey powder of metallic arsenic is obtained, which by rubbing in an agate mortar acquires metallic lustre, and on heating volatilizes, leaving a residue of oxide of tin. Several analyses of the precipitate by volatilization in a stream of carbonic acid, gave the following numbers :—

1. Was a solution of arsenious acid.
2. Of arsenic acid,
3. Of arseniate of ammonia and magnesia, in fuming hydrochloric acid, precipitated by protochloride of tin.

The protochloride of tin was prepared by dissolving tin-foil in hydrochloric acid, and saturating the solution by hydrochloric acid gas.

	Quantity taken.	*Residue.*	*Arsenic.*
1.	0·6774	0·0104	98·46%
1.	0·5139	0·0074	98·56%
2.	0·9086	0·0336	96·30%
2.	0·7372	0·0274	96·29%
3.	0·7507	0·0311	95·86%

The precipitate was never obtained pure from tin. In an aqueous solution of arsenious or arsenic acid, no precipitation occurs with protochloride of tin; if, however, sufficient strong hydrochloric acid be added to make the mixture faintly fume, precipitation ensues. Precipitation therefore depends on the concentration of the acid, as the following experiments already show :—

Hydrochloric acid containing arsenic of sp. gr.	}	1·188 gives immediate precipitation.
,,	,,	1·135 the same.
,,	,,	1·123 precipitates after some minutes.
,,	,,	1·115 incomplete precipitation after some time.
,,	,,	1·100 no precipitate.

Regarding a solution of arsenious acid in concentrated hydrochloric acid as a solution of chloride of arsenic in hydrochloric acid, it is manifest that the reaction takes place merely between protochloride of tin and chloride of arsenic; and also, that in a hydrochloric acid solution of 1·115 sp. gr., arsenious acid exists, partly as such, and partly as chloride of arsenic; in acid of 1·100 sp. gr. only as arsenious acid. A remarkable delicacy of the reaction was noticed: acid containing only $\frac{1}{1\,775000}$ its weight of arsenic gave a precipitate after 20 minutes. A solution 0·002 grms. of arsenic diluted 1 million times, can be recognised with the greatest certainty. As protochloride of tin is without action on antimony, the detection of arsenic may be made in presence of this metal, care being always taken to have the liquid saturated with hydrochloric acid. Presence of sulphuric or tartaric acid does not prevent the precipitation. In tartar emetic regarded as free from arsenic, a very marked quantity of arsenic was detected. As a quick, ready, and certain method for the detection of arsenic in presence of antimony, this test will be welcome. Acid containing arsenic was mixed with fuming stannous chloride solution, allowed to stand 24 hours, filtered and distilled. Neither by the Marsh test nor sulphuretted hydrogen, could a trace of arsenic be detected.

Arsenic in Sulphuric and Hydrochloric Acids, and Subnitrate of Bismuth. The detection of arsenic in sulphuric acid, hydrochloric acid, subnitrate of bismuth, and tartar emetic. This is a simplification of Bettendorf's method recommended by Dr. Hager.

Testing sulphuric acid for arsenic. Into a not too narrow test-glass, in which is put as much stannous chloride as will cover a knife's point, pour 4 to 8 c. c. of pure hydrochloric acid of 25 per cent. strength; shake to dissolve the protochloride of tin, and add drop by drop 2 to 3 c. c. of the acid to be tested. After each addition gently agitate. The mixture gets very warm. Should a white precipitate be formed, hydrochloric acid may be added till the liquid is clear again. If no arsenic be present the liquid remains clear and colourless, even after standing some time. On the other hand, the presence of arsenic is seen by the liquid becoming yellowish, then brownish, gradually browner, turbid, and at last a dark

grey brown. After some hours the arsenic is in the form of grey brown flocks. A faint yellowish colouration results from $\frac{1}{5000}$ of arsenious acid; this after half-an-hour becomes brown. This test will be recognised as extremely delicate and not far behind the Marsh test in that respect. The heating of the mixture of stannous chloride, hydrochloric acid, and the suspected liquid, is of importance in order to hasten the reaction. Should the sulphuric acid not be so concentrated as to give sufficient heat on mixing with the hydrochloric acid liquid, a little pure sulphuric acid is added, or heat is applied by a lamp if the hydrochloric acid is strong enough.

The testing of hydrochloric acid for arsenic is the same as the foregoing, except that in place of pure hydrochloric, the acid to be tested is used, and instead of the sulphuric, pure monohydrated acid is made use of. Subnitrate of bismuth may be directly tested for arsenic according to this method; it is necessary to use somewhat more stannous chloride and hydrochloric acid. Into a wide short test tube put about 0·5 grms. of bismuth precipitate, pour over it about 1 c. c. of sulphuric acid, and drive out nitric acid by a gentle heat. Then pour 4–5 c. c. of pure 25 per cent. hydrochloric acid into the tube, and after solution is accomplished, drop in 1·5 to 2 grms. of stannous chloride, to which, when solution has taken place, add 2 to 3 c. c. of concentrated pure sulphuric acid. If neccessary heat to boiling. Colouration or turbidity follows sooner or later, according to amount of arsenic present.

Tartar emetic is dissolved in the hydrochloric acid, and the sulphuric is added gradually. Oxide of antimony gives no reduction by this treatment.

Copper, on the Detection and Estimation of, in Organic Mixtures, especially Extracts. If the liquid be dark coloured or turbid, place it in a beaker; acidify with a little hydrochloric acid, and place in it a few rods of zinc with a smooth and bright surface; the rod may be scraped smooth with a knife. Watch then carefully every fifteen minutes. As soon as the immersed end is covered with a dark brown layer, take out the rods, and place the brown ends in warm water for some minutes at a temperature of 60–80° C.; acidify the water with four to six drops of hydrochloric acid; take the rods out and let them dry. On a sheet of white glazed paper scrape the rods with a knife to detach the brown layer, and place them again in the solution to which has been added a few drops more of hydrochloric acid. This operation is repeated till on staying an hour in the solution no further colouring of the rods occurs. Should the solution tested be thick and slimy, a gentle warmth

should be applied. The hot water in which the rods are washed should have a piece of zinc rod standing in it, in order to take up the faintest trace of copper. It is to be observed that the liquid must not be too acid, otherwise the copper coating would be displaced from the zinc by the violent evolution of hydrogen, and the copper coating should not be too thick also. The metal scraped off, consisting of zinc and copper, is put in a test-tube, and treated with 10 per cent. hydrochloric acid, and when the first violence of the reaction has passed off, it is gently warmed. The zinc is dissolved, but not so the copper; it remains in brown flocks. The liquid is diluted with spirit, the copper is allowed to settle, the liquid decanted, treated again with spirit, decanted, washed with ether, and lastly with petroleum spirit; the glass is dried with its contents of copper. It is astonishing what small quantities of copper may in this way be collected. In two different extracts, each of which contained 0·0798 grammes of copper, there was found in the one 0·08 and in the other 0·077.

Copper, on the Application of an Alkaline Glycerine Solution of, to the Estimation of Grape Sugar. (By Dr. Julius Lœwe.) Glycerine possesses the property of preventing the precipitation of copper oxide by the alkalies. The solution of cupric oxide in an alkaline glycerine liquid behaved like the tartrate of soda copper solution. It is, however, much more stable, and is more easily prepared.

Take 16 grammes of sulphate of copper, dissolve in 64 c. c. water, and add gradually, avoiding development of heat, 80 c. c. of caustic soda solution of 1·134 sp. gr.; add 3 to 6 or 8 grms. of pure glycerine, till complete solution is accomplished, which is recognised at once by the deep azure blue clearness of the liquid. If hydrate of copper of constant composition, which dissolves readily by the aid of glycerine in caustic alkali, may be prepared by dissolving finely powdered copper sulphate in ammonia, and adding soda solution gradually till the liquid becomes turbid, the precipitate may be readily washed on a filter with cold water, and dried at 30° C., or, under the air-pump with sulphuric acid.

In order to establish the identity of the precipitate with copper; dissolve on a porcelain crucible lid, with a drop of sulphuric acid, to which is added a little nitric; evaporate off the nitric acid, and test a drop of the solution with potassium ferrocyanide and another with strong ammonia.—*Hager's Centralhalle.*

Copper and Iron Test.—An alcoholic solution of logwood, according to Felix Bellamy, is an extremely sensitive test for iron and

copper, and especially adapted for the detection of these metals in potable waters. A suitable tincture is prepared by digesting 12 to 15 grammes of logwood in 100 grammes of alcohol, which had previously stood over caustic lime for some days, and was afterwards distilled off so as to free it from every possible trace of iron or copper. If 20 drops of this tincture be shaken with 200 c. c. of water containing either iron or copper, the liquid becomes yellow through excess of carbonic acid, rose-violet, if the bicarbonate of the alkalic or alkaline earths predominate. If an iron or copper wire be now dipped into the liquid, the hematoxyline combines with the metal, and the colour changes to blue; a blue streak is seen descending from the metal to the bottom of the vessel. According to Bellamy, either iron or copper in such a state of dilution as 1 in 20,000,000 of water can be recognised by a change of colour, while 1 in 5,000,000 gives a marked blue precipitate. Pump-water passing through iron or copper pipes now and then shows traces of the metals. The blue colouration of ordinary white paper by logwood tincture is owing to the presence of one of these metals.

Iodoform, as a Reagent for detecting Alcohol. This test originated with Lieben (*Ann. der Ch. u. Ph. Suppl:* VII. *Heft* 2); the method of applying it, slightly modified, is as follows:—Iodine dissolved in a solution of iodide of potassium in 5 to 6 parts of water, and a potash solution of about 10 per cent. strength, are the reagents. To the clear suspected liquid are added 5 to 6 drops of the potash solution; heat to 40° or 50° C., and and the iodine solution, with gentle shaking, till a yellowish brown colour is produced. Should this not disappear after agitation, a drop of the alkali is added, by means of a glass rod, till the liquid is quite discoloured. Standing in a quiet place allows the microscopic crystals of iodoform to collect on the bottom of the test tube. Decant and place the last drops of the liquid under the microscope. The crystals magnified from 3 to 500 times are of very beautiful geometric forms, readily recognised. Spirit, diluted 2000 times, treated in this manner, and allowed to stand for a day, gives a dustlike deposit of iodoform. This very elegant reaction is given, not only with alcohol, but with many other substances which Lieben enumerates as follows:—Acetone, ethylic alcohol, aldehyde, amylosene, benzol (?), butyric aldehyde, butyrate of methyl, butylic alcohol, caprylic alcohol, kinic acid, dulcin, acetic ether, gum, meconic acid, methylic alcohol, methylbenzoyl, lactic acid, many volatile oils, propionic aldehyde, propilic alcohol, protein substances, oil of turpentine, sugar.

If the suspected substance is insoluble in water, it is violently

shaken with 5 to 10 times its quantity of lukewarm water, poured into a well moistened filter, and the clear filtrate is tested.

Adolf Lieben states, with respect to the iodoform test for spirit of wine, that he prepared pure methylic alcohol from methylic oxalate, and that when treated with iodine and potash, no iodoform was obtained. The formation of iodoform he attributes to acetone and ethylic alcohol occurring as impurities.

Nitric Acid Test. Sulphate of aniline is stated to be a surprisingly delicate test for nitric acid.

About a cubic centimetre of pure concentrated sulphuric acid (sp. gr. 1·84) is placed in a watch glass; half a cub. centimetre of a solution of sulphate of aniline (formed by adding ten drops of commercial aniline to 50 c. c. of diluted sulphuric acid in the proportion of 1 to 6) is poured on, drop by drop; a glass tube is moistened with the liquid to be tested, and moved circularly in the watch-glass. By blowing on the mixture during the gentle agitation, when a trace of nitric acid is present, circular striæ are developed of a very intense red colour, tinting the liquid rose. With more than a trace of nitric acid the colour becomes carmine, passing to a brownish red. This process serves to detect the presence of nitric acid in the sulphuric acid of commerce. It will also reveal the presence of nitrates in water.

Nitrites, Estimation of, in Potable Water. Dr. Apjohn. (*The Medical Press and Circular*, vol. viii., p. 475.) At one of the meetings of the Dublin Scientific Club, Dr. Apjohn communicated a process, which he has found successful, for the quantitative determination of nitrites in the presence of nitrates as they are usually found in potable water. The process rests upon the fact that potassium iodide in solution is decomposed by dilute sulphuric acid in the presence of nitrites, iodine being liberated, thus :—

1. $KNO_2 + KI + H_2SO_4 = K_2SO_4 + HNO_2 + HI$.
2. $HNO_2 + HI = H_2O + NO + I$.

With nitrates this reaction does not take place "provided the solution is sufficiently dilute." The liberated iodine is readily determined volumetrically by means of a standard solution of sodium hyposulphite, each atom found corresponds with a molecule of nitrous acid.

Olive Oil, Method of ascertaining the Purity of. (*Journ. de Pharm. et de Chim.*) M. de Beck says, that from the results of the numerous experiments made by Dr. Ramon Codina Langlies, a pharmacist of Barcelona, it appears that the best reagent for the examination of oils is that of Hauchecorne. This reagent is composed of three

parts of pure nitric acid at 40 degrees with one part of distilled water. The following is Dr. Codina's method of proving that olive oil does not contain seed oil, and more particularly oil of cotton:—

He mixes three grammes of the oil to be tested with one gramme of the reagent in a test tube or a small stoppered flask, and heats the liquid in a water bath. If the oil is pure the mixture becomes clearer, and takes a yellow colour like purified oil; if it is adulterated with seed oil it acquires the same transparency as the pure oil, but becomes red.

With 5 % of seed oil the reddish colouring is characteristic; with 10 % it is decided. The reaction does not require more than from 15 to 20 minutes.

The colouring of the oils lasts for three days.

Ol. Sinapis.—Tests for Oil of Mustard. If one or two drops of the oil be dropped on water, they should on very slight disturbance sink to the bottom unchanged and clear. A trifling mixture with benzine or petroleum causes the drops to remain on the surface. Mixture with 5 per cent. of alcohol of 90 per cent. strength, causes the drops to be opalescent. If five drops of the oil have 50 drops of strong colourless and pure sulphuric acid and the two be shaken together, the oil dissolves to a clear liquid, either without change of colour, or with a deepened yellow tinge; admixture with other vegetable oils causes a darkening, and presence of bisulphide of carbon is shown by the latter separating out in little drops, and making the liquid turbid. If the clear solution with sulphuric acid be allowed to trickle down the side of a wet glass, alcohol is shown by a milk white turbidity.

Permanganate of Potassium, Action of, upon Cinchonine. MM. E. Caventou and Ed. Willm state that when a cold and saturated solution of permanganate of potassium is added, drop by drop, to a solution, also cold, of sulphate of cinchonine, with addition of sulphuric acid, decolouration instantly takes place, with deposition of peroxide of manganese. The reaction is complex; its principal products being—1. An indifferent compound, uniting with either bases or acids, which they call cinchotenine. 2. A well crystallized acid, to which they give the name of carboxycinchonic. 3. A substance reducing potassio-partrate of copper. Besides these products of oxidation, there is also a special base, distinct from cinchonine, with the formula $C_{20}\,H_{26}\,Az_2\,O$, or containing two equivalents of hydrogen more than the formula usually adopted for cinchonine, and which they therefore call hydro-cinchonine. It is distinguished by being only slightly acted on in the cold by the permanganate; and the

authors therefore suppose that it exists ready formed in the bark of the cinchona, and is possibly a constituent of cinchonine, which has been supposed by some to be a mixture of two bases. The other properties are very similar to those of cinchonine, melting at 268° instead of 257°; and deflecting the plane of polarization somewhat less, but in the same direction (right); it is insoluble in water, but soluble in alcohol, and forms crystallizable salts, soluble in water, of a bitter taste. Cinchotenine is the most abundant product of oxidation; its composition is $C_{18} H_{20} Az_2 O^3$; it is deposited from its boiling aqueous solution in silky silver-white crystals, slightly soluble in cold water, very easily soluble in boiling alcohol. It is almost neutral in its reactions, dissolving equally well in acids and alkalies, but insoluble in concentrated potash. It is acted on with difficulty by the permanganate, even when hot; and is dextrogyrous. Carboxycinchonic acid $C_{24} H_{14} Az_2 O_4$ is produced not by oxidation only, but by fixation of carbon in addition. It is soluble in water, especially hot, crystallizing in anhydrous prisms, hard and brilliant, soluble in strong alcohol. It is a bibasic acid, forming with alkalies and baryta very soluble salts, crystallizing with difficulty. Salts have been found with baryta, copper, and silver, bearing the following composition:—$C_{24} H_{12} Az_2 O_4 Ba''$, $C_{24} O_{12} Az_2 O_4 Cu''$, and $C_{24} O_{12} Az_2 Ag_4 O_2$. The acid dissolves in hydrochloric and sulphuric acids. (*Comptes Rendus*, July 26, 1869.)

Solubility of some Chemicals in Glycerine. Klever. 100 parts glycerine dissolve the annexed quantities of the following chemicals:

Acid. arseniosum	20	Ferri et potas. tart	8
,, arsenicum	20	,, lactat.	16
,, benzoicum	10	,, sulph.	25
,, boracicum	10	Hydrarg. chlor. corros.	7·50
,, oxalicum	15	,, cyanid.	27
,, tannicum	50	Iodinium	1·90
Alumen	40	Morphia	0·45
Ammon. carb.	20	Morph. acet.	20
,, muriat.	20	,, muriat.	20
Antimonii et potas. tart.	5·50	Phosphorus	0·20
Atropia	3	Plumb. acet.	20
Atropia sulph.	33	Potas. arsen.	50
Barii chlorid.	10	,, chlorat.	3·50
Brucia	2·25	Potassii bromid.	25
Calcii sulphid	5	,, cyanid.	32
Cinchonia	0·50	,, iodid.	40
Cinch. sulph.	6·70	Quinia	0·50
Cupri acetat.	10	Quiniæ tanat.	0·25
,, sulph.	30	Sodæ arseniat.	50

Sodæ bicarb.	8	Strychn. sulphat.	22·50
,, borat.	60	Urea.	50
,, carbonat.	98	Veratria.	1
,, chlorat.	20	Zinci chlorid.	50
Sulphur	0·10	,, iodid.	40
Strychnia	0·25	,, sulphat.	35
Strychn. nitrat.	4		

Test-paper, new. M. Böttger has produced a new test-paper, which is highly sensitive towards the alkalies and alkaline earths. The reagent is a magnificent colouring matter, obtained from the leaves of an exotic plant (*Coleus Verschaffeltii*), upon digestion for twenty-four hours with absolute alcohol, to which a few drops of sulphuric acid have been added. The paper is prepared for use by the usual process. The colour is a splendid red, which passes more or less rapidly into a fine shade of green, by the action of the alkalies or the alkaline earths. It is far more sensitive than either litmus or turmeric; it is unaffected by carbonic acid, and will indicate the presence of the smallest traces of the carbonates of the alkaline earths in water. A moistened strip of this paper, when held at the opening of a gas-jet, immediately assumes a green colour if ammonia be present.—*Cosmos.*

Washing Precipitates. An apparatus serving the purpose of extracting small quantities of certain substances with water, spirit, benzol, etc., by the application of vapour in the place of hot liquid, may be readily fitted up in the following manner. A funnel placed in a filter-stand has a platinum shield and filter paper fitted in, as in the Bunsen apparatus, or instead of the platinum, a filter-paper of vegetable parchment pierced with holes is used as a support for the filter; a similar funnel is inverted over this; if the edges of each be ground so as to fit closely, so much the better. The two funnels are held together by stretching over the meeting edges an india-rubber ring, such as might be cut from a piece of wide caoutchouc tube; a piece of tubing goes from the tube of the upper funnel to a flask of boiling water or alcohol; there is thus a pressure within the apparatus and upon the filter. This is seldom so great as to burst the paper, as a small quantity finds a way of escape between the glass and the paper.

Bollay in this way has extracted fat with ether vapour and colouring matters with alcohol, in a much shorter time than by the other method.

Zinc, on the Occurrence of Stains in the Marsh-test. E. Brescius Wackenroder found that zinc and hydrochloric acid, both free

from arsenic or antimony, evolved hydrogen, the flame of which gave black stains on a white porcelain surface. The author proved that if the evolution of gas be brisk, and the means of purifying it insufficient, chloride of zinc is carried off which the hydrogen flame reduces to the metallic state. No such stains were produced by sulphuric acid. It is recommended that the gas be passed first through oil of vitriol, then through cotton wool or chloride of calcium, and lastly through an empty tube, also that the evolution be moderated by adding the acid gradually.

Zinc Sulpho-phenate. (*Sulpho-carbolate of Zinc.*) Dr. Hager.* The preparation of this salt presents no difficulties if pure crystallized phenol (carbolic acid) and pure sulphuric acid ($H_2 S O_4$) are operated on. Equal weight parts of both are digested at about 125° F. for two or three days. When the phenol is pure, a clear, yellowish, thick liquid is obtained, which on cooling deposits conglomerations of crystals (probably uncombined phenol), but which soon congeal to a white crystallized mass. Although all conditions are present to combine all the sulphuric acid with the phenol, yet there remains always, and no matter how long the digestion may be continued, a surplus of about 10 per cent. sulphuric acid. For this reason it is advisable to mix 120 parts of sulphuric acid to every 100 parts of phenol. After two or three days the combination is accomplished, and the mixture is then diluted with ten times its bulk of water. Now twice as much as the quantity of sulphuric acid operated upon, or better, a little more, of dry barium carbonate, is gradually added (to 120 parts $H_2 S O_4$, 245 parts $Ba C O_3$). The latter had better be triturated with some water before it is added to the acid. Under evolution of carbonic acid, barium sulpho-phenate is formed, a salt soluble in water and in alcohol. At the same time any excess of free sulphuric acid is neutralised and transformed into barium sulphate. The whole is allowed to stand in a warm place for some hours, and is then filtered through a damp filter; the remainder on the filter is washed with some warm water. The filtered solution of barium sulpho-phenate may be evaporated to dryness, whereby it remains behind as a white salt deprived of its water of crystallization. This is soluble in two parts of water. A small quantity of this barium salt is retained, the balance is dissolved in water in the proportion of 10 parts of the first to 30—40 parts of

* Translated from Dr. Hager's *Pharmaceutischer Centralhalle*, No. 1, 1870 (January 6, 1870), by Dr. F. Hoffmann in the *American Journal of Pharmacy*, March, 1870. The notation and nomenclature have been simplified in this reprint.

the latter. To this filtered solution a solution of 6 parts crystallized zinc sulphate in about 18 parts of water is added. Of this zinc solution a small quantity is also retained. Now, after leaving the mixture on the water bath for several hours, about 10 drops of the supernatant solution are diluted in a test tube with about 100 drops of water; this being divided in two parts, the one is examined with some drops of the retained zinc sulphate solution, the other with the barium sulpho-phenate solution. If any reaction ensues in either case, the one or other of the retained solutions has carefully to be added to the bulk of the solution, in order to accomplish the exact decomposition. A slight excess of zinc sulphate should, however, prevail, so that the barium may be completely precipitated.

Finally, the filtered solution of zinc sulpho-phenate is evaporated under continual stirring until a drop, when allowed to fall on a cold glass plate, congeals to a solid mass. The liquid is then allowed to cool under frequent stirring, and the resulting salt mass is dried in a warm place. When completely dry it forms a white salt.

The evaporation of the solution of the barium sulpho-phenate, its re-solution and the filtration, are only required when a phenol has been operated on which was not palpably pure. When this, however, is the case, the solution of barium sulpho-phenate may be decomposed, without any further operation, by the zinc sulphate solution, with the precaution to retain some of the first solution in order to meet an accidental excess of the zinc solution. For every 100 parts of phenol operated upon, 142 parts of crystallized zinc sulphate may be added, of which only one-twelfth may be retained for further addition if required.

The preparation of zinc sulpho-phenate may be facilitated by the use of perfectly pure reagents. When they have been mixed and combined in the above-stated proportions and process, the warm solution, after having been diluted with twice its bulk of water, is gradually neutralised with zinc oxide (free of oxide of iron). When no more oxide is dissolved the warm solution is allowed to cool, and is then filtered; the filtrate is evaporated to nearly half its original bulk, and is then mixed and shaken with ten times its volume of alcohol (90—92 per cent.), and the mixture is allowed to stand in a cool place for several days. The zinc sulphate separates as a powder; the supernatant alcoholic solution of zinc sulpho-phenate may either be directly evaporated to dryness or the alcohol may first be restored by distillation, and the evaporation may then be accomplished. The residue is white zinc sulpho-phenate of a purity that it yields with barium chloride but a slight reaction.

One molecule of phenol, or phenyl-alcohol, reacts with one molecule of sulphuric acid, to form a compound ether, sulpho-phenic acid ($C_6 H_6 S O_4$). This, when combined with barium, forms $Ba (C_6 H_5 S O_4)_2$, and, with zinc, the corresponding zinc salt. The barium salt, when crystallized from its aqueous solution, forms rhombic crystals, with three proportions of water of crystallization; the zinc salt, when crystallized, forms bright lamellas, with seven proportions of crystallization water. The officinal salt derived by exsiccation is deprived of the water of crystallization; it dissolves in two parts of water of medium temperature, and in five parts of alcohol of 90 per cent.

The preparation of zinc sulpho-phenate from a not quite pure phenol yields different results. The sulpho-phenic acid is then dark coloured, and the solutions of salts therewith prepared have a pink colour. The zinc sulpho-phenate when crystallized has a pink colour; when desiccated, a reddish tint. This colouration, however, does not at all impair their medicinal value and their therapeutical action.

These more or less coloured solutions of the zinc sulpho-phenate, when near the end of their evaporation, emanate a remarkably fine odour, resembling that of pelargonium. This observation may likely trace to a new source a fine perfume. Some of our most brilliant colours are derived from a similar origin.

Zinc sulpho-phenate combines the therapeutical virtues of zinc sulphate and of phenol. Its solution for injections is obtained by dissolving one part of the salt in 150 to 200 parts water.

MODERN CHEMICAL THEORY,

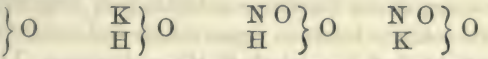
FOUNDED ON THE STUDY OF ORGANIC BODIES.*

Dr. Debus.—*Proc. Brit. Assoc. Exeter.*

(abstract.)

Our views relative to the combinations of atoms in molecules, and our methods of ascertaining this arrangement, have, however, undergone great alterations and received great additions during the last ten or fifteen years. To a consideration of these changes I will now, for a short time, invite your attention. Since our modern views, however, originated in a great measure from the study of organic bodies, and since the majority of chemists now devote their time and labour thereto, I shall confine my remarks principally to the organic branch of the subject.

Eighteen years ago Professor Williamson read before the members of this association a remarkable paper, which contained the germ of our modern chemical views, and was the cause of many important discoveries. He proposed to regard three large classes of bodies, acids, bases, and salts, from the same point of view, and to compare their chemical properties with those of one single elected substance. For this term of comparison he chose water. Now water is composed of three atoms, two of hydrogen and one of oxygen. Williamson showed that all oxygen acids, all oxygen bases, and the salts resulting from a combination of the two can, like water, be considered to be composed of three parts or radicals, two of the radicals playing the part of the hydrogen atoms in water, and the third that of the atom of oxygen; thus:—



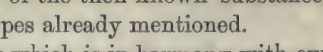
Water. Potassic hydrate. Hydric nitrite. Potassic nitrite.

Potassic hydrate is water which has one of its atoms of hydrogen replaced by an atom of potassium, hydric nitrite is water which has one atom of hydrogen replaced by nitric oxide, and potassic nitrite is water with one of its hydrogen atoms replaced by nitric oxide and the other by potassium. This speculation, as every chemist knows, is well supported by experiments; it embraces three large classes of bodies which till then had been considered as distinct. M. Gerhardt,

* Compare with this the paper on Chemical Nomenclature: the two will serve to elucidate this difficult and important subject, which has effected so great a change in the chemistry of our day.

in 1853, extended Williamson's views by distinguishing two other types of molecular structure, represented respectively by hydrogen and ammonia, and succeeded, by help of the radical theory, in arranging the identity of the then known substances under one or the other of the three types already mentioned.

Like every theory which is in harmony with experience, the above considerations led to results of unexpected importance; for it soon became apparent that the radicals which thus replace hydrogen in water are not all of the same chemical value. If we place together the formulæ of hydric nitrite and carbonic acid



Hydric nitrite. Carbonic acid.

we perceive at once that the atomic group NO has replaced one atom of hydrogen in one molecule of water, and carbonic oxide, C O, two atoms of hydrogen in one molecule of water. Nitric oxide (N O) is therefore said to be equivalent to one atom of hydrogen, and carbonic oxide (CO) equivalent to two atoms of hydrogen. The radical of phosphoric acid [P O_4] is found to be equivalent to three atoms of hydrogen. Professor Odling was one of the first to observe this difference in the equivalents of atoms and groups of atoms, or compound radicals as they are termed, a difference which he marks as shown in the following examples:—

Radicals.

Equivalent to one atom of hydrogen.		Equivalent to two atoms of hydrogen.	
Nitric oxide	$(NO)'$	Carbonic oxide	$[CO]''$
Methyl	$(CH_3)'$	Methylene	$[CH_2]''$
Ethyl	$(C_2H_5)'$	Ethylene	$[C_2H_4]''$

The notion of equivalence enabled Professor Kekule to form most interesting speculations on the constitution of organic bodies, and to explain the relation between composition and equivalence of such radicals as methyl, CH_3, ethyl, C_2H_5, methylene, CH_2, ethylene, C_2H_4, and acetylene, C_2H_2.

If from one molecule of marsh-gas, CH_4, one atom of hydrogen is abstracted, the residue, CH_3, called methyl, can combine with an atom of hydrogen again, and produce the original marsh-gas molecule. But methyl, instead of combining with an atom of hydrogen, can unite with an atom of chlorine, or an atom of bromine, that is to say, the place of the atom of hydrogen can be taken by an atom of chlorine or bromine. Methyl being thus equivalent to an atom of hydrogen, is said to be univalent. If from a molecule of marsh-gas two atoms of hydrogen are removed, the residue, CH_2, called methylene, can

again unite with two atoms of hydrogen, or, instead of hydrogen, two atoms of chlorine or bromine, and form the compounds CH_4, CH_2, Cl_2, CH_2, Br_2, respectively. Methylene, therefore, being equivalent to two atoms of hydrogen, is termed bivalent. The radical CH, left after the abstraction of three atoms of hydrogen from marsh-gas, is able to reproduce with three atoms of hydrogen one molecule of marsh-gas, or to combine with three atoms of chlorine, and form chloroform, CHC_3. The residue, CH, is thus trivalent, or equivalent to three atoms of hydrogen. In the same manner carbon is found to be quadrivalent or equivalent to four atoms of hydrogen; but carbon, formen, CH, methylene, CH_2, methyl, CH_3, not only combine with hydrogen, chlorine, or other elements according to their equivalence, but also amongst themselves, and thus produce the so-called hydrocarbons, native as well as artificial. Methyl combines with methyl and produces dimethyl, or better known as ethylic hydride, $CH_3 + CH_3 = C_2H_6$; methylene combines with methylene and forms ethylene, $CH_2 + CH_2 = C_2H_4$. Methylene is bivalent and methyl univalent; therefore methylene combines with two equivalents of methyl and forms propylic hydride, C_3H_8, $CH_2 + 2CH_3 = C_3H_8$. Six equivalents of formen are supposed to be contained in benzol [C_6H_6], $6CH = C_6H_6$.

What has been said of marsh-gas also applies to ammonia and water. Ammonia, NH_3, minus one atom of hydrogen, forms the univalent radical, NH_2, minus two atoms of hydrogen, the bivalent radical, NH, and nitrogen itself is trivalent, that is to say, it can replace three atoms of hydrogen in compounds, or can combine with three atoms of hydrogen. Water minus one atom of hydrogen produces the univalent radical hydroxyl, HO, and water without both atoms of hydrogen gives us divalent oxygen. These radicals, NH_2, NH, N, HO, and O, can combine with each other, and with methyl, methylene, formen, and carbon respectively, in different proportions. Thus methyl, methylene, and hydroxyl are contained in common alcohol. The union of methyl, carbon, oxygen, and hydroxyl gives acetic acid, $C_2H_4O_2$:—

$$CH_3 + C + O + HO = C_2H_4O_2.$$

Glycocoll is considered as a combination of methylene, amidogen [NH_2], carbon, oxygen, and hydroxyl:—

$$CH_2 + NH_2 + C + O + HO = C_2H_5NO_2 = \text{glycocoll.}$$

The radicals C, CH, CH_2, CH_3, HO, O, N, NH, NH_2, and CO are considered to form the proximate constitutents of the most important organic compounds. It often happens that, from the union of the same radicals, two or more bodies of the same composition, but

differing from one another in properties, result. Glycocoll, as well as glycolamide, contain the radicals methylene, hydroxyl, carbonic oxide, and amidogen, NH_2. In such cases the nature of the compound depends on the arrangement of the radicals, as may be seen by the following formulæ :—

$$CH_2 . NH_2 . CO . HO = C_2H_5NO_2 = \text{glycocoll.}$$
$$CH_2 . HO . CO . NH_2 = C_2H_5NO_2 = \text{glycolamide,}$$

Now the great problems with whose solutions scientific chemists are occupied is—*To determine, first, what sort of radicals of the above nature are contained in a given organic body, and, second, how these radicals are grouped amongst each other.*

There are several ways of solving this problem. The molecule may be built up by placing the radicals which are supposed to exist in it under suitable conditions in contact. Two molecules of iodopropionic acid placed together with metallic silver will lose their iodine, and the residues of the two molecules remain united. A new acid, called adipic acid, is thus formed.

$$\left.\begin{matrix}\text{Iodopropionic acid} \\ \text{Iodopropionic acid}\end{matrix}\right\} \begin{matrix}CO.HO \\ CH_2 \\ CH_2I \\ + \\ CH_2I \\ CH_2 \\ COHO\end{matrix} + Ag_2 = 2AgI + \left\{\begin{matrix}COHO \\ CH_2 \\ CH_2 \\ CH_2 \\ CH_2 \\ COHO\end{matrix}\right. \begin{matrix}\\ \\ \text{adipic} \\ \text{acid.} \\ \\ \\ \end{matrix}$$

We know, therefore, the radicals of adipic acid, and their arrangement, if we possess the same knowledge with regard to iodopropionic acid.

The above elegant synthesis has lately been performed by Professor Wislicenus, of Zurich. M. Berthelot has now succeeded in producing representatives of the principal classes of hydrocarbons from the elements of carbon and hydrogen, and Messrs. Bauer and Verson, of Vienna, have prepared from Amylene, C_5H_{10}, a compound, $C_{10}H_{16}$, which appears to be identical with terebene, a body closely allied to turpentine.

Another way to determine the proximate constituents of molecules, is to take the little structures to pieces, and to form a judgment of their constitution from the radicals which thus can be extracted. This plan has been adopted by Mr. Chapman, and described by him at one of our former meetings.

The more common and more reliable method for the determination of the grouping of atoms in molecules is, however, the replacement of one or more of them by atoms of another kind, and the

careful examination of the properties of the bodies thus formed. M. Gautier has recently obtained a new substance of the same composition as acetonitrile, which he calls methcarbylamine. According to their formation, acetonitrile, as well as methcarbylamine, can be considered as combinations of cyanogen and methyl = CH_3CN. The two bodies, however, do not possess the same properties; if they are heated with potassic hydrate and water, methcarbylamine produces formic acid and methylia, whereas the same reagents cause acetonitrile to form acetic acid and ammonia. Thus

$$\underbrace{C_2H_3N}_{\text{Acetonitrile.}} + \underbrace{2H_2O}_{\text{Water.}} = \underbrace{C_2H_4O_2}_{\text{Acetic acid.}} + NH_3$$

$$\underbrace{C_2H_3N}_{\text{Methcarbylamine.}} + 2H_2O = \underbrace{CH_2O_2}_{\text{Formic acid.}} + \underbrace{N\left\{\begin{matrix}CH_3\\H_2\end{matrix}\right.}_{\text{Methylia.}}$$

In the first case, the radical methyl remains after the decomposition in union with carbon, and in the second case in combination with nitrogen. Accordingly it is supposed that the same arrangement prevails in the undecomposed molecules, and with this supposition all the other properties of methcarbylamine and acetonitrile agree. In symbols these relations are expressed as follows:—

$$N\left\{\begin{matrix}C''\\CH_3\end{matrix}\right. = \text{methcarbylamine.}$$
$$N\left\{\begin{matrix}C_2H_3\end{matrix}\right. = \text{acetonitrile.}$$

This case of isomerism is most interesting, inasmuch as it furnishes a most instructive lesson on the grouping of atoms. The homologous bodies of methcarbylamine in the ethyl and probyl series have also been obtained.

Isomerism, indeed, has received much attention during the last year, and a great many interesting discoveries have resulted; of these, one more example may by mentioned. We know two compounds of the formula CN_2H_4O; the one is ammonic cyanate, and the other urea. Until recently, only one corresponding sulphur-compound, ammonic sulpho-cyanate, was known. Professor Reynolds has succeeded in obtaining the true sulphur-urea, a body isomeric to ammonic sulphocyanate.

Thus every year produces results which improve our conceptions of the atomic and molecular constitution of bodies; and as our knowledge improves, new questions suggest themselves, and our power over the elements increases. It has already become possible to prepare in the laboratory bodies of a very complex character, such

which a few years ago were only found in the bodies of animals or plants.

Alizarin, the beautiful compound of the madder root, has been obtained by artificial means in the course of the year by Messrs. Liebermann and Græbe. Results of such a nature render it highly probable that, at no distant period, it will be in our power to prepare artificially nearly all, if not all, the substances found in plants and animals. Here I must not be misunderstood. Organic structures, such as muscular fibre or the leaves of a tree, the science of chemistry is incapable of producing; but molecules like those found in a leaf or in the stem of a tree will no doubt one day be manufactured from their elements.

[Modern chemistry seems to be a convertible term for high mathematics.—*Ed.*]

NOTES.

NOTES.

NOTE I.—DISPENSING.

1. Detached caution labels, as *poison*, *to be shaken*, and *for external use*, should be placed on the upper part of the bottle, near the shoulder, because then they are read first, which is of the utmost importance. If pasted at the bottom of the bottle, below the written label, the hand that holds the bottle conceals involuntarily the note of warning which the dispenser was most anxious to convey.

2. When two tablespoonfuls of an eight ounce mixture are ordered to be taken, the directions ought to state "an eighth part," and the bottle should be graduated. A modern tablespoonful holds an ounce, hence double doses may be given by too literally following the directions.

3. In making effervescent mixtures with potash or soda, and citric acid, or the like, during the winter months, the water should be slightly warmed, which will greatly promote the effect intended, and prevent subsequent explosion.

4. In blending into emulsion balsam and mucilage, the action is retarded by the acidity of the mucilage. Made from pulv. acaciæ it is always acid. The addition of a few drops of liquor potassæ is of appreciable advantage.

5. To exhibit castor oil. Pour the dose into an ounce of cinnamon water, and a little syrup; beat together with a small stick, and drink immediately when well intermingled.

6. Mist. amygdalæ and compounds. Blanch the almonds in cold water, not hot. This is also the direction of the Paris Codex.

NOTE II.—DOMESTIC.

Facts about Gas.—*How to Read the Meter.*—There is no valid reason why consumers of gas should not be able to read the meter for themselves, and know exactly the amount of gas that is consumed. The meter is placed in every dwelling, giving equal privilege to the consumer as well as the gas company, to learn by its self-registering

index the amount of gas consumed. If this knowledge was general, it would remove silly prejudice, that great "bone of contention," between those who pay for the gas and those who receive the pay; for it is a faithful arbiter, and gives no favour to one more than another.

The meters (both wet and dry) in ordinary use will be found to have three indexes; the hand on the first or right hand index moves to the right as the fingers read, and each index begins at a cipher (0) at the top, and reads, 1 to 2 to 3 and so to the cipher again, which is 10. When the hand on the right index has moved to 1, it indicates that 100 cubic feet of gas have been used or passed the meter; when it points to 5 it means 500 feet, and after completing the circuit at (0) it is 1000 feet. Each of the indexes are ten-fold multipliers of the one preceding. Single figures are used for want of room, but the multiplier is generally placed above the index; thus the right hand is "one thousand," the next to the left or middle index is "ten thousand," and the last or left hand index is "one hundred thousand." Therefore on the first or right hand index, 1 on the dial stands for 100; in the middle index 1 stands for 1000; and 1 on the left hand index stands for 10,000; and so in this ratio with the succeeding figures respectively.

To read the meter, begin with the left index, and write down the figure last passed by the pointer; then write down the figures last passed on the second index, and proceed in like manner with the third or right hand index. Now add two ciphers (00), and it will give the amount of gas registered in cubic feet. Suppose the first index was 2, the second index 5, and the third index 6, making 256, now add two ciphers, and you will have 25,600, being the amount of gas used at that time.

At the end of the month (or at any other time) read the meter again and the figures will read, say 26,500 after adding the ciphers; now deduct the first sum from the last, and you will have the difference, 900, which indicates the number of feet used since the first reading.

A few minutes' practice at reading meters, generally called "taking the meter," will make any one quite familiar with the matter, and will give the gas consumer a wonderful degree of satisfaction, and often bring about a much better feeling towards the gas company who supply the gas. Among other things it will show you

How to Detect Escaping Gas.—If your gas bills seem too high, or you have the evidence of escaping gas by sense of smell, but not

positively so, take a reading of the meter when no burners are in use, and after an hour or so repeat the reading, and if gas is escaping it will be shown. To detect the locality of the leak is often a more difficult matter. The first thing is to see that no burners have been left turned on by accident, which is often the case where the cock has no *stop*, and is caused by the cock being turned partially round again so as to open the vent. Imperfect stop-cocks are for this reason dangerous, and should be at once removed.

The next thing to do in order to detect a leak is to try the joints of the gas-fittings. The sense of smell will frequently be sufficient by bringing the face near the suspected joint; a lighted taper or match held near the joint is a more certain plan. If gas is escaping, it will take fire at the leak, or if too little to burn steadily it will momentarily catch and extinguish in little puffs.

Sometimes the gas escapes from the joints or imperfect piping between the ceiling and floor, or behind the walls or casings.

If beneath the floor, the sense of smell will generally detect the section of the floor under which the leak is, as it escapes owing to its levity upwards through the crevices of the floor, and penetrates the carpet, if there be one. If bracket or side burners are used, and the escaping gas is behind the walls or casings, the crevices in the casings, or the opening where the pipe enters the room, will let the escaping gas enter the room sufficiently at these points to indicate somewhat nearly the location of the leak.

In such cases the proper way is never to apply a light to the crevices or cases, but to turn off the gas at the meter and send for a gasfitter, otherwise an explosion may occur involving serious consequence. In ordinary leaks of gas fixtures and pipes, whether at the joints or at the attachment of the burner, the fitting or burner should be unscrewed, and white lead or common bar soap rubbed in the threads, and then screwed home again. This can often be done without any aid from a gasfitter.—*American Gas Light Journal.*

Analysis of some Malt Liquors. Contents per pint:—

	Sp. Gr.	*Malt per barrel.*	*Alcohol fl. ozs.*	*Extract ozs.*	*Acid grs.*
Old Burton, Allsopp's 1869 . . .	1040·38	4·50	2·16	2·77	29·12
Mild Ale, Truman, Hanbury & Co. .	1010·76	2·72	1·66	1·09	19·45
Cowley's Alton Ale, Mild XXXX .	1027·34	3·20	1·59	—	—
Scotch Ale, Campbell	1009·40	2·47	1·50	1·02	24·78
Guinness's Stout	1015·51	2·88	1·74	1·25	21·32

NOTE III.—MEDICAL.

The Administration of Chloroform.—Preliminaries. 1. Unless very feeble, the patient should fast for three hours before the inhalation.

2. Ten minutes before the inhalation, a dose of brandy should be given in water—a teaspoonful to a child, one or two tablespoonfuls to an adult.

3. The patient should, whenever convenient, be wholly undressed, and invariably everything tight about the chest or neck should be removed.

4. If possible, let the patient be in the recumbent posture, and on his back. Let the chest and neck be well exposed. Whatever form of apparatus be used (a piece of lint, a handkerchief, or Skinner's inhaler, are perhaps among the best), you may begin boldly. There is no risk with the first inhalations; and the patient may be instructed "to draw full breaths." So soon as any effect is manifest, you must be more cautious. Watch carefully the respiratory movements, and colour of the cheeks, lips, and eyes. If the patient struggle much, proceed with increased caution.

Signs of Danger. *Lividity of Face.*—Remove the chloroform, and let the patient have air. Open the mouth and draw out the tongue.

Stertorous Respiration.—Stop the chloroform, open the mouth, draw forward the tongue, and watch carefully.

Irregular Gasping Respiration.—Stop the chloroform, dash cold water on the face, and flip with the towel.

Death-like Pallor.—This, the most dangerous sign of all, must be met without a moment's loss of time. Flip with the wet towel on the cheeks, chest, abdomen, etc. Open the mouth, and if, as is usual, breathing has ceased, begin artificial respiration at once. With outspread palms, press the front of the chest forcibly down, whilst an assistant at the same time presses the abdomen. Make these movements not oftener than fifteen times in the minute. Air should be heard to enter the trachea. Whilst this is being done, let assistants continue most vigorously to flip the skin in all accessible positions—it cannot be done too much. If the collapse continue, let an ounce of brandy be injected into the rectum. Do not remit the artificial respiration until the patient is quite rallied. If the collapse persist, the efforts at rallying should be persevered with for an hour at least. If a large catheter be at hand, it may be well to introduce it into the trachea, and inflate the lungs by the mouth. Remember that irregular inspiratory efforts may occur long after death in all other

respects has apparently taken place. Do not be deceived by them, but continue your efforts.

Remarks. The plan of artificial respiration recommended is, we believe, all things considered, the most convenient. The catheter in the trachea is, when practicable, the most effectual plan. Its introduction is not difficult. If the artificial inspirations be made too rapidly, they defeat their own object; nor should they be too forcibly made. If it be needful to continue them more than a few minutes, the operator will find it convenient to kneel astride the patient's trunk.

The administrator ought always to have with him brandy, an enema-springe, and a large flexible catheter. He ought always, when convenient, to require his patient to be undressed, since it may be very desirable to have the surface accessible.—*British Medical Journal.*

NOTE IV.—STRYCHNIA COLOUR-TEST.

On the most Delicate Colour-test for the Detection of Strychnia. (William T. Wenzell, of San Francisco, Cal.) [In testing for minute portions of the alkaloid] I have found that a solution of one grain of permanganate of potassa in 2000 grs. of sulphuric acid is, *par excellence*, the test for that purpose. In delicacy of reaction, brilliancy of colours and duration, I have found it to be, in parallel experiments made with the bichromate of potassa and sulphuric acid test, greatly its superior.

While I do not claim priority of discovery of a valuable re-agent in the use of the permanganate,—an honour which duly belongs to Wm. A. Guy, of London, and to whose valuable investigations on alkaloids and their tests I take pleasure in referring,*—I would simply state that I was not cognizant of its use as a test for alkaloids prior to the time when I first tried it; but becoming acquainted with that fact, I henceforth relinquished all claim. Believing it to be a valuable reagent, I determined to test its value,—considering a solution of the permanganate in sulphuric acid proper, and preferable to a solution in water, inasmuch as the water can act only as a diluent, and therefore must prove to some degree detrimental to the sensibility of the test. Further, a solution of the permanganate in

* On Colour Tests of Strychnia and the Diagnosis of the Alkaloids. By William A. Guy, M.D. Cantab., vol. ii. and iii, pp. 558, 602. 11 and 12 *Pharm. Journ. and Trans.*

water (10 grs. to ʒ1) possesses a deep purple colour, which might possibly become a source of error, while on the other hand a solution of that salt in sulphuric acid (1 gr. to 2000 grs.) exhibits a light green colour, which is less liable to be confounded with the colours developed during the application of the test.

The test solution of strychnia was made with the crystallized alkaloid dissolved by the intervention of sulphuric acid in water; each drop of the solution representing the $\frac{1}{60000}$ of a grain of the alkaloid. A pipette was used capable of dropping one-sixth of a drop. The drop here alluded to was carefully ascertained to be equal to 1·2 minim. So that the pipette drop was equal to 0·2 minim. The dilutions were prepared from this normal solution. The following table will exhibit the different strychniated solutions prepared for experiment, with amounts of strychnia contained in each one-sixth drop, and the comparative results obtained by the application of the different test agents employed :—

Amount of strychnia contained in $\frac{1}{6}$ drop of each solution.	K O, 2 Cr O^3 and S O^4 H test (solid).	Cr O^3 and S O^4 H test (1—500).	K O, Mn^2 O^7 and S O^4 H test (1—2000).
$\frac{3}{6}$ drop $\frac{3}{2}$ × 50,000 = 1-100,000	Colour reaction distinct and well defined.	Colour reaction very fine and distinct.	Reaction very brilliant and durable.
$\frac{1}{6}$ drop $\frac{6}{1}$ × 50,000 = 1-300,000	Reaction weak and evanescent.	Colours fine and distinct.	Colours brilliant and reaction distinct.
$\frac{1}{6}$ drop $\frac{12}{1}$ × 50,000 = 1-600,000	No reaction.	Colours still definable, but weak.	Reaction distinct and colours fine.
$\frac{1}{6}$ drop $\frac{18}{1}$ × 50,000 = 1-900,000	——	No reaction.	Reaction faint, but succession of colours well defined.
$\frac{1}{6}$ drop $\frac{24}{1}$ × 50,000 = 1-1,200,000	——	——	Reaction very faint.

It will be seen on inspecting the above table that the limit of positive recognition by the bichromate of potassa and sulphuric acid test may be placed at $\frac{1}{120000}$, that of the chromic acid, etc., test at $\frac{1}{60000}$, and that of the permanganate at $\frac{1}{60000}$. The manner in which the experiments were conducted may be stated as follows :—

The one-sixth of a drop of the normal solution was dropped from the pipette upon a warmed, highly glazed porcelain surface, and allowed to evaporate spontaneously. The thin circular film which

the drop left was readily perceived by the aid of a good light. It was found that the alkaloid contained in the drop tends on evaporation to crystallize principally near the edges of the drop, thus forming the margin, which constitutes the circular outline of the film. It is therefore the margin of the evaporated drop that will furnish the most decided evidence of the presence of the alkaloid. By means of a blunt-pointed glass rod, the point of which had been slightly moistened with sulphuric acid, a small drop was placed upon the margin of the film, and in using the bichromate test, a most minute crystal of that salt was placed upon or pushed into the drop of acid, and by means of a glass rod the crystal, together with the acid, was drawn around the margin of the film. This mode of procedure with this test, although very delicate, will fail to detect the strychnia positively in this fractional drop. By superimposing and evaporating successively three one-sixth drops, the reaction is then rendered quite positive.

In testing with the liquid reagents the sulphuric acid must be added in extremely minute quantities. A mere dot placed upon the margin of the film must be regarded as sufficient, and its effect upon the deposit carefully observed. Then by means of a small pipette, the point of which is drawn to a capillary bore and charged with the reagent, a minute drop of it is allowed to flow upon the dot of acid, when by means of a pointed glass rod drawn around the margin of the spot, the colours created by the reagent are obtained with various degrees of vividness and duration, according to the amount of alkaloid contained in the deposit, and the permanganate test will positively indicate the 1-900,000th of the alkaloid. I have successfully concentrated a one-sixth drop by placing the porcelain plate obliquely while the droplet is evaporating; the drop will gradually contract on the glazed surface to about one-third of the space it would have otherwise occupied, and thus serve to insure more positive results. Scrupulous accuracy and cleanliness should be observed in conducting these microchemical manipulations. The reagent ought to be freshly prepared from pure materials, of proper strength, and used quantitatively with the greatest care.—*Philadelphia, August* 28, 1870.

NOTE V.—STUDENT MANIPULATION.

H. G. Madan.

1. Be orderly and neat in manipulation. Cleanliness stands at the head of the chemist's scale of virtues. All messes must be

cleared away with the zeal of a sanitary inspector. Never go to work or continue to work with the table covered with a litter of bottles, flasks, basins, and test-tubes; but replace each bottle on the shelf as soon as you have done with it, and have a basin at hand in which to put dirty test-tubes, etc. Always wash your test-tubes twice: once, before they are put away; and again, with distilled water, immediately before they are used. Possibly more puzzling reactions occur from the use of dirty test-tubes than from any other cause.

2. Do not begin work in a hurry. What is expended in time is very often gained in power, in grasp of a subject. Yet, on the other hand, learn to be economical of time. Several filtrations and evaporations, for instance may be going on at once. The chemist may sometimes, in spite of the proverb, do more than one thing at a time, by allowing things to do themselves.

3. Be economical of materials. In analysing a substance, do not (without the strongest reasons) use up at once the whole quantity at your disposal. Reserve at least one-fourth of it in a corked tube or covered watch-glass, in case unforeseen accidents should occur, and the other portion should be lost. In making a gas, the residue left in the generating vessel will often be of use, at any rate, interesting as a specimen. It should not, as a rule, be thrown away, but purified by recrystallization or otherwise.

4. Never begin an experiment until you have looked over all the preparations for it, to make sure that you have everything that is necessary within reach. You will not then have the mortification of seeing the half-performed experiment fail for want of some requisite which cannot be procured at the moment.

5. Never add one chemical substance to another without considering for what purpose you add it, and what various effects may be produced.

6. Do not think merely of what will *do*, but what is *best*, of the means at your disposal.

7. Be exact and methodical. Let nothing pass unnoticed, although you may not see its significance at the moment. Make written notes of everything that you do, analyses of lectures, sketches of apparatus. Whatever is worth doing is worth recording.

8. Do not attempt to devise a modification of an experiment until you have tried it in exact accordance with the directions given. Then, and then only, if you fail, you will find it possible to blame the book and not yourself.

9. Do not expose yourself needlessly to vapours which you

know to be injurious—*e. g.*, chlorine, hydrogen sulphide, hydrogen arsenide. Remember that the bad effects may not be perceptible immediately.

10. Finally, do not look upon chemistry as a mere amusement, as a means of getting up a few explosions, creating a few unsavoury smells, producing a few striking changes of colour. Chemistry is worthy of better treatment; it is no longer a "black art," but a refined science, and should be thoughtfully and reverently studied.

Nor, again, give up hopes of making discoveries in the science because the land appears to be already highly farmed, and you have not all the refined apparatus which the optician and the operative chemist can supply. Records of close and accurate observations of some of the (apparently) simplest phenomena of chemistry are much needed, and such it is in the power of very student to contribute.

SOME WORKS CONSULTED.

Lancet.
British Medical Journal.
Chemical News (London).
Nature.

Pharmaceutical Journal (London).
Journ. Chemical Society (London).
Proceedings of Royal Society.
Practitioner.
Chemist and Druggist.
Food Journal.

Proceedings British Association.

Journ. Royal Dublin Society.
Dublin Medical Press.
Dublin Quart. Journ. Med. Science.
Dublin Quart. Journ. Science, and other Irish publications.

Botanical Publications British and Foreign.

Scientific American.
American Journal of Pharmacy.
Pharmacist.
The Arts (Chicago).
Boston Journ. of Chemistry.
Canadian Pharm. Journal.
American Druggist's Circular.
Journ. of Materia Medica (New Lebanon).
Dental Cosmos (Philadelphia).
Proceedings of Amer. Pharm. Association, 1869.

Australian Med. Journal.

Bulletin de la Société Chimique (Paris).
Journ. de Pharmacie et de Chimie.
Répertoire de Pharmacie.
Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences (Paris).
Centralblatt Med. Wissen.
Archiv. für Physiol.
Du Bois Reymond's Archiv.
Max Schultze's Archiv.
Hager's Centralhalle.

NOTICES OF INSTITUTIONS.

LEARNED SOCIETIES AND INSTITUTIONS.

Society of Arts. John Street, Adelphi. Founded in 1754. Incorporated in 1847.

Secretary.—P. Le Neve Foster, M.A.

Meetings of the Society.—The session commences in November and ends in June. At the Wednesday evening meetings during the session, papers on subjects relating to inventions, improvements, discoveries, and other matters connected with the arts, manufactures, and commerce of the country, are read and discussed, full reports of them being given in the weekly journal published by the society. These meetings are free to the members of the society, who are entitled to admit *two* friends to each meeting.

Cantor Lectures.—In addition to the Wednesday evening meetings, courses of lectures, entitled "Cantor Lectures," are delivered on subjects bearing upon the arts, the applied sciences, commerce, and industry. These lectures are free to members of the society, who are entitled to admit *two* friends to each lecture.

Journal of the Society of Arts.—This *Journal*, which is sent free to members, is published weekly, and contains in addition to the reports of the society's proceedings, reports of the institutions in union, and a variety of information connected with arts, manufactures, and commerce. The *Journal* is also the official organ of the forthcoming series of annual international exhibitions, the first of which is to be held in 1871.

Library and Reading-room.—The library and reading-room are open to members, who are also entitled to borrow books.

Conversazioni are held, to which the members are invited, each member receiving a card for himself and lady.

Membership.—The society consists of upwards of three thousand members. Gentlemen desirous of becoming members should communicate with the secretary. The annual subscription is two guineas, or a life subscription of twenty guineas may be paid. There is no entrance fee.

Chemical Society, Burlington House, Piccadilly.

President.—A. W. Williamson, Ph.D., F.R.S.

Business commences at eight o'clock. The annual general meet-

ing for the election of officers will be held on Thursday, March 30, 1871, at eight o'clock in the evening.

It was stated at the anniversary meeting, that arrangements had been made to give greater publicity to the proceedings of the society, and that accordingly arrangements had been made for sending abstracts of the papers to such periodicals as desire to publish them. Another matter of importance, which has been referred to a subcommittee of the Council, is the plan to publish, conjointly with the French Chemical Society, monthly reports of all that is done in the science in England, France, and Germany. The president hopes at the next anniversary meeting, to be able to congratulate the society on the commencement of a system of international working.

Royal Geographical Society, 15, Whitehall Place.

President.—Sir Roderick Murchison.

Meetings.—From January to June, in the hall of the University of London.

It had been arranged, by permission of the senate of the University of London, to hold the meetings for the present session in their great hall, but as the arrangements for lighting the same will not be completed before December, the use of the theatre of the Royal School of Mines has been granted by Sir Roderick Murchison (with the permission of the Lords of the Privy Council) for the first three meetings of the session; on Tuesdays, instead of Mondays, in consequence of the Lectures to Working Men taking place on the last-mentioned days.

Geological Society, Somerset House, Strand.

President.—Joseph Prestwich, Esq., F.R.S.

Secretaries.—P. Martin Duncan, M.B., F.R.S.; John Evans, Esq., F.R.S.

Assistant-Secretary.—W. S. Dallas, F.L.S.

Clerk.—W. W. Leighton.

The council have awarded the Wollaston Medal to M. G. P. Deshayes, Professor of Natural History in the Musée d'Histoire Naturelle, Paris, in testimony of appreciation of his valuable palæontological labours, especially his recently completed magnificent work on the Invertebrate Fossils of the Paris basin.

The balance of the proceeds of the Wollaston Fund has been awarded to M. Marie Rouault, Directeur Conservateur du Musée Géologique de Rennes, in aid of those valuable researches upon the palæontology of the Silurian and Devonian rocks of Brittany which

he has already carried on for years with most important results, notwithstanding the pressure of great difficulties.

Linnean Society, Burlington House, Piccadilly.

President.—George Bentham, Esq.

Founded in 1788, for the cultivation of the science of Natural History in all its branches. Incorporated by royal charter, in 1802.

The fellows are entitled to receive, *gratis*, all volumes, or parts of volumes, of the Transactions and Journal that may be published after they shall have paid one yearly contribution, or to all published after their election, if they shall have paid the composition in lieu of annual payments; and they may be supplied with any of the volumes published before their election, at a reduction of 25 per cent. under the common selling prices.

The library is open to all members of the society between the hours of ten and four daily, and fellows may introduce their friends in person, or by a letter to the librarian.

Members may obtain the loan of books from the library with leave of the council; but no more than four volumes can be borrowed at one time, nor is any book to be kept longer than six weeks.

The ordinary meetings are held on the third Thursday in January, the first and third Thursdays in February, March, and April, the first Thursday in May, and on the first and third Thursdays in June, November, and December, at eight o'clock in the evening; and every member may introduce a friend.

The anniversary meeting for the election of council and officers is held at three p.m., on the 24th of May or on the following day, if the 24th should happen to be a Sunday.

It need scarcely be mentioned to any frequenter of the society's rooms, that Mr. Kippist is the admirable librarian.

Royal Society of Literature, St. Martin's Place.

President.—The Lord Bishop of St. David's.

Meetings every Wednesday fortnight. Antiquarian and literary subjects are discussed.

London Institution, Finsbury Circus.

President.—Thomas Baring, Esq., M.P., F.R.S.

Founded 1805. Incorporated by royal charter 1807.

The advantages of this institution are too little known; it possesses a noble library, to which is added a library of circulation. English and Foreign.

Royal Institution, Albemarle Street.

President.—Sir HENRY HOLLAND, Bart.

There are two laboratories, one for researches in physical, the other chemical science. The library contains about 36,000 volumes. The lectures are too well-known to need description; those given on Friday evening form part of the attractions of the London season.

The rooms are much patronised as a West-End Club, every accommodation being provided for reading and writing.

PROFESSORS.

Professor of Natural Philosophy.—JOHN TYNDALL, Esq., LL.D., F.R.S., &c.

Fullerian Professor of Chemistry.—WILLIAM ODLING, Esq., M.B., F.R.S.

Fullerian Professor of Physiology.—MICHAEL FOSTER, Esq., B.A., M.D., F.L.S.

Royal Microscopical Society, King's College, London.

President.—The Rev. J. B. READE, M.A., F.R.S.

Meetings on the second Wednesday in each month. The library and reading-room is open for the use of fellows on Mondays, Tuesdays, Thursdays, and Fridays, from 11 A.M. to 4 P.M.; and on Wednesdays from 7 to 10 P.M.

Pharmaceutical Society, 17, Bloomsbury Square.

President.—GEORGE WEBB SANDFORD, Esq.

PROFESSORS.

Lecturer on Chemistry and Pharmacy.—THEOPHILUS REDWOOD, Ph.D., F.C.S.

Lecturer on Botany and Materia Medica.—ROBERT BENTLEY, F.L.S., M.R.C.S.

Professor of Practical Chemistry and Director of the Laboratory.—JOHN ATTFIELD, Ph.D., F.C.S.

BOARDS OF EXAMINERS.

England and Wales.

ALLCHIN, ALFRED, London.
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INCE, JOSEPH, London.
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PERSONAL NOTICES.

PERSONAL NOTICES.

Adapted in abstract from Dr. Bence Jones.

Faraday, Michael, was born at Newington in Surrey, September 22, 1791. His father was a blacksmith, and sent the lad to an ordinary day-school, where he learnt the rudiments of reading, writing, and arithmetic. At thirteen years of age he went as errand-boy to a bookbinder and stationer of the name of Richard, to whom he was in the following year bound apprentice. Here his taste for scientific pursuits early showed itself. In the notes he afterwards made of his own life he says, "Whilst an apprentice I loved to read the scientific books which were under my hands, and amongst them delighted in Marcet's 'Conversations on Chemistry' and the electrical treatises in the 'Encyclopædia Britannica.' I made such simple experiments in chemistry as could be defrayed in their expense by a few pence per week, and also constructed an electrical machine, first with a glass phial, and afterwards with a real cylinder, as well as other electrical apparatus of a corresponding kind." He seems to have been singularly fortunate in his employer, through whose considerate kindness he was allowed to attend some lectures on natural philosophy by Mr. Tatum, in Dorset Street, Fleet Street. In order to illustrate these lectures he set himself to study perspective, copying all the drawings in a volume of Taylor's Perspective he had borrowed, and exercising himself in all the rules by other drawings of his own. In 1812 he attended four of the last lectures of Sir H. Davy at the Royal Institution, taking notes of them, and afterwards writing them out most fully and carefully. These notes he was advised to send to Sir Humphrey Davy himself, and received from him in reply the following kind acknowledgment.

"Sir, I am far from displeased with the proof you have given me of your confidence, and which displays great zeal, power of memory, and attention. I am obliged to go out of town, and shall not be settled in town till the end of January; I will then see you at any time you wish. It would gratify me to be of any service to you. I wish it may be in my power. I am, sir, your obedient humble servant."

This led to a personal interview, and in the following year when

the assistantship in the laboratory of the Royal Institution became vacant, Sir Humphrey Davy recommended Faraday to the managers, who gave him the place, with a salary of 25*s.* a week, and two rooms at the top of the house. Henceforward, he was free to give up his whole time and attention to those experimental researches in which he found such especial delight;—with what gain to the world at large is shown by the story of his life, which soon became one long chronicle of scientific discoveries.

In the autumn of 1814, Sir Humphrey Davy, who was going abroad for some months, offered to take Faraday with him as his amanuensis, promising him that he should resume his situation at the Royal Institution on his return. He accepted the offer, and accompanied Sir H. Davy in France, Italy, Switzerland, the Tyrol, Geneva, etc., till the following April, when they returned to England, and Faraday was again appointed assistant to the laboratory, with a trifling increase of salary.

His first lectures were given at the City Philosophical Society, in 1816. They were on chemistry, and were called by him "An Account of the inherent Properties of Matter, of the Forms in which Matter exists, and of Simple Elementary Substances." His first published paper was an analysis of native caustic lime, which appeared in the *Quarterly Journal of Science* in the same year.

In 1820 his first paper was read to the Royal Society on two new compounds of chlorine and carbon, and on a new compound of iodine, carbon, and hydrogen. He began in conjunction with Mr. Stodart, the surgical instrument maker, a long series of experiments and trials on steel, with the hope of improving it. Two years afterwards a paper on the Alloys of Steel, by Stodart and Faraday, was read to the Royal Society, and printed in the Transactions. In 1821, Faraday married Miss Sarah Barnard. He had just previously been appointed superintendent of the house and laboratory.

We now come to Faraday's experimental researches on Ampère's theories on electro-magnetism, and his first conclusion is this:—

"I find all the usual attractions and repulsions of the magnetic needle by the conjunctive wire are deceptions, the motions being not attractions or repulsions, nor the result of any attractive or repulsive forces, but the result of a force in the wire, which, instead of bringing the pole of the needle nearer to or further from the wire, endeavours to make it move round it in a never-ending circle and motion whilst the battery remains in action. I have succeeded not only in showing the existence of this motion theoretically, but experimentally; and have been able to make the wire revolve round a magnetic pole,

or a magnetic pole round the wire, at pleasure. The law of revolution, to which all the other motions of the needle and wire are reducible, is simple and beautiful. Conceive a portion of connecting wire north and south, the north end being attached to the positive pole of a battery, the south to the negative; a north magnetic pole would then pass round it continually in the apparent direction of the sun from east to west above, and from west to east below. Reverse the connections with the battery, and the motion of the pole is reversed. Or if the south pole is made to revolve, the motions will be in the opposite directions, as with the north pole.

"If the wire be made to revolve round the pole, the motions are according to those mentioned. For the apparatus I used there were but two plates, and the direction of the motions was of course the reverse of those with a battery of several pair of plates, and which are given above. Now I have been able experimentally to trace this motion into its various forms, as exhibited by Ampère's helices, etc., and in all cases to show that dissimilar poles repel as well as attract, and that similar poles attract as well as repel, and to make, I think, the analogy between the helice and common bar-magnet far stronger than before; but yet I am by no means decided that there are currents of electricity in the common magnet. I have no doubt that electricity puts the circles of the helice into the same state as those circles are in that may be conceived in the bar-magnet; but I am not certain that this state is directly dependent on the electricity, or that it cannot be produced by other agencies, and therefore, until the presence of electrical currents be proved in the magnet by other than magnetical effects, I shall remain in doubt about Ampère's theory."

On Christmas day he succeeded in making a wire, through which a current of voltaic electricity was passing, obey the magnetic poles of the earth in the way it does the poles of a bar-magnet.

Mr. George Barnard, who was with him in the laboratory at the time, writes:—"All at once he exclaimed, 'Do you see, do you see, do you see, George!' as the small wire began to revolve. One end I recollect was in the cup of quicksilver, the other attached above to the centre. I shall never forget the enthusiasm expressed in his face, and the sparkling in his eyes."

In May, 1823, his certificate was read for the first time at the Royal Society. Considerable opposition was raised to his election at first, owing to an impression that he had made an unworthy use of knowledge gained while assisting Sir H. Davy in his experiments, and that in a paper on magnetism he had published as his

own what were really only results brought out by theories and views of others; but from all these imputations he succeeded in effectually clearing himself, and was elected Fellow of the Royal Society, in January, 1824. In 1825 he was made Director of the Laboratory of the Royal Institution. In 1827 he gave his first course of lectures in the theatre of the institution, on Chemical Philosophy. Of this year also he writes:—"The president and council of the Royal Society applied to the president and managers of the Royal Institution for leave to erect on their premises an experimental room with a furnace, for the purpose of continuing the investigation on the manufacture of optical glass. They were guided in this by the desire which the Royal Institution has always evinced to assist in the advancement of science; and the readiness with which the application was granted showed that no mistaken notion had been formed in this respect. As a member of both bodies, I felt much anxiety that the investigation should be successful. A room and furnace were built at the Royal Institution in September, 1827, and an assistant was engaged, Sergeant Anderson, of the Royal Artillery. He came on the 3rd of December." This investigation did not succeed in the direction anticipated, but the use of the glass manufactured became of the utmost importance eventually in Faraday's diamagnetic and magneto-optical researches. It was at Christmas, in this year, that he first gave the juvenile lectures. In 1831 he began the first of the eight manuscript volumes of his Experimental Researches, which are now among the most valued possessions of the Royal Institution. Whenever he was about to investigate a subject, he wrote out, on separate slips of paper, different queries regarding it, which his genius made him think were "naturally possible" to be answered by experiment. He slightly fixed them one beneath another, in the order in which he intended to experiment. As a slip was answered, so it was removed, and others were added in the course of the investigation, and these, in their turn, were worked out and removed. If no answer was obtained, the slip remained to be returned to at another time. Out of the answers, the manuscript volumes were formed, and from these the papers were written for the Royal Society, where they were always read before the popular account of them was given to the Royal Institution at a Friday evening meeting.

In November of this year he writes from Brighton: "We are here to refresh. I have been working and writing a paper that always knocks me up in health, but now I feel well again, and able to pursue my subject, and now I will tell you what it is about. The

title will be, I think, 'Experimental Researches in Electricity:'—1. On the Induction of Electric Currents; 2. On the Evolution of Electricity from Magnetism; 3. On a new Electrical condition of Matter; 4. On Arago's Magnetic Phenomena. There is a bill of fare for you! and, what is more, I hope it will not disappoint you. Now the pith of all this I must give you very briefly, the demonstrations you shall have in the paper when printed.

"1. When an electric current is passed through one of two parallel wires, it causes at first a current in the same direction through the other; but this induced current does not last a moment, notwithstanding the inducing current (from the voltaic battery) is continued; all seems unchanged, except that the principal current continues its course. But when the current is stopped, then a return current occurs in the wire under induction, of about the same intensity and momentary duration, but in the opposite direction to that first formed. Electricity in currents, therefore, exerts an inductive action like ordinary electricity, but subject to peculiar laws The effects are a current in the same direction when the induction is established, a reverse current when the induction ceases, and a *peculiar state* in the interim. Common electricity probably does the same thing; but as it is at present impossible to separate the beginning and the end of a spark or discharge from each other, all the effects are simultaneous and neutralise each other.

"2. Then I found that magnets would induce just like voltaic currents, and by bringing helices and wires and jackets up to the poles of magnets, electrical currents were produced in them, these currents being able to deflect the galvanometer, or to make, by means of the helix, magnetic needles, or, in one case, even to give a spark. Hence the evolution of *electricity from magnetism*. The currents were not permanent; they ceased the moment the wires ceased to approach the magnet, because the new and apparently quiescent state was assumed just as in the case of the induction of current; but when the magnet was removed, and its induction, therefore, ceased, the return currents appeared as before. These two kinds of induction I have distinguished by the terms *volta-electric* and *magneto-electric* induction. Their identity of action and results is, I think, a very powerful proof of M. Ampère's theory of magnetism.

"3. The new electrical condition which intervenes by induction between the beginning and end of the inducing current gives rise to some very curious results. It explains why chemical action or other results of electricity have never been as yet obtained in trials

with the magnet. In fact, the currents have no sensible duration. I believe it will explain perfectly the *transference of elements* between the poles of the pile in decomposition; but this part of the subject I have reserved until the present experiments are completed; and it is so analogous, in some of its effects, to those of Ritter's secondary piles, De la Rive and Van Beck's peculiar properties of the poles of a voltaic pile, that I should not wonder if they all proved ultimately to depend on this state. The condition of matter I have dignified by the term *Electrotonic*, The Electrotonic State. What do you think of that? Am I not a bold man, ignorant as I am, to coin words? but I have consulted the scholars. And now for 4.

"4. The new state has enabled me to make out and explain all Arago's phenomena of the rotating magnet or copper plate, I believe, perfectly; but as great names are concerned (Arago, Babbage, Herschel, etc.), and as I have to differ from them, I have spoken with that modesty which you so well know you and I and John Frost have in common, and for which the world so justly commends us. I am even half afraid to tell you what it is. You will think I am hoaxing you, or else, in your compassion, you may conclude I am deceiving myself. However, you need do neither, but had better laugh, as I did most heartily, when I found that it was neither attraction or repulsion, but just one of my *old rotations* in a new form. I cannot explain to you all the actions, which are very curious; but in consequence of the electrotonic state being assumed and lost, as the parts of the plate whirl under the pole, and in consequence of magneto-electric induction, currents of electricity are formed in the direction of the radii,—continuing, for simple reasons, as long as the motion continues, but ceasing when that ceases. Hence, the wonder is explained that the metal has powers on the magnet when moving, but not when at rest. Hence is also explained the effect which Arago observed, and which made him contradict Babbage and Herschel, and say the power was repulsive; but, as a whole, it is really tangential. It is quite comfortable to me to find that experiment need not quail before mathematics, but is quite competent to rival it in discovery; and I am amazed to find that what the high mathematicians have announced as the *essential condition* to the rotation, namely, that *time is required*, has so little foundation, that if the time could by possibility be anticipated instead of being required, *i.e.*, if the currents could be formed *before* the magnet came over the place instead of *after*, the effect would equally ensue."

In 1833, a professorship of chemistry with a salary of about £100 a year was founded at the Royal Institution by Mr. Fuller, and

Faraday was appointed to it with the privilege of giving no lectures. In 1835 he received a government pension. In 1836 he was appointed scientific adviser in experiments on light to the Corporation of the Trinity House, an appointment which he held during thirty years. It involved an enormous amount of labour, and led him into an entirely new field of research and experiment. In 1844 he was elected one of the eight foreign associates of the Academy of Sciences in Paris. Gratifying as this election was, it was but one of the innumerable testimonies in recognition of his character and genius which he received from every country in Europe, as well as from the scientific societies in America. In 1851, he closed the series of Experimental Researches in Electricity.

It began in 1831 with the induction of electric currents, and his greatest discovery, the evolution of electricity from magnetism; then it continued to terrestrial magneto-electric induction; then to the identities of electricity from different sources; then to conducting-power generally. Then came electro-chemical decomposition; then the electricity of the voltaic pile; then the induction of a current on itself; then static induction. Then the nature of the electric force or forces, and the character of the electric force in the *Gymnotus*. Then the source of power in the voltaic pile; then the electricity evolved by friction of steam; then the magnetization of light and the illumination of magnetic lines of force; then new magnetic actions, and the magnetic condition of all matter; then the crystalline polarity of bismuth, and its relation to the magnetic form of force; then the possible relation of gravity to electricity; then the magnetic and diamagnetic condition of bodies, including oxygen and nitrogen; then atmospheric magnetism; then the lines of magnetic force, and the employment of induced magneto-electric currents as their test and measure.

In 1858, Prince Albert offered Faraday a house on Hampton Court Green, where he spent much time during the remaining nine years of his life.

He was beginning to feel the effect of the immense mental exertion in which he had passed so many years. "My memory," he wrote, "wearies me greatly in working . . . nevertheless I know that to wear somewhat, is far better than to stand still, even if nothing comes of it. It is better for the mind itself." And so, with steadfast purpose, he wrought on, gradually relinquishing his public appointments as he found physical weakness increase; but pursuing his researches, and from time to time reporting their results.

"My life," he wrote, "has been a happy one, and all I desired.

During its progress I have tried to make a fitting return for it to the Royal Institution, and through it to science. But the progress of years (now amounting in number to three-score and ten), having brought forth first the period of development, and then that of maturity, has ultimately produced for me that of gentle decay."

He died at Hampton Court on the 25th of August, 1867.

The Faraday Lectureship in the Chemical Society. The Chemical Society, having recently founded a lectureship, partly commemorative of a late distinguished fellow of the society, Professor Faraday, and partly with the view of promoting intercourse and interchange of ideas between eminent foreign chemists and the chemists of this country, invited M. Dumas, of Paris, to deliver the first of these lectures, which it is expected will be followed by others from year to year. The great celebrity of Dumas' name, associated as it has been for half a century with various departments of theoretical and applied chemistry, and also with pharmacy (for he was originally a *pharmacien*), caused much interest to be felt in connection with this inaugural address; and as the new building which he government is erecting for the Chemical Society at Burlington House is not yet completed, the use of the lecture-theatre of the Royal Institution in Albemarle Street was obtained for this occasion. The first address of the Faraday lecturer was thus very appropriately delivered within the walls where Faraday and his early associates, Sir Humphrey Davy and Dr. Thomas Young, had so often addressed crowded and aristocratic audiences.

The lecture was delivered on Thursday, the 17th of June, and the theatre was well filled with a highly appreciative audience; the fact of its being in a foreign language, however, no doubt limited the attendance, and prevented many from enjoying the rich intellectual feast which was thus provided.

The chair was taken by Professor Williamson, President of the Chemical Society, who in a very appropriate manner introduced M. Dumas, and at the same time presented him with the Faraday medal, the possession of which is associated with the lectureship.

The lecture, which occupied an hour and twenty minutes, was delivered with great fluency and apparent ease. Without once faltering or failing for a word, and without any reference to notes, the distinguished chemist and orator, who we are informed (for we needed to be so informed) has passed his 70th year, delivered an address which may be pronounced a masterpiece of elocution. It is not easy to give a satisfactory summary of this oration, which must have been heard to be fully appreciated; and it certainly will

not be readily forgotten by those who had the good fortune to be present. After expressing an eloquent eulogium on his late friend Faraday, and referring to the important labours and discoveries of the great philosopher, he reviewed the work of other eminent chemists of the past and of some of those then present, including among the former, Lavoisier, Priestly, Dalton, Prout, etc., and among the latter, Frankland, Williamson, Tyndall, and, above all, Graham. Tracing back to remote antiquity the early dawnings of science, he brought before his hearers a brief statement of some of the most important steps made in the progress of chemical knowledge. He thus compared the knowledge now possessed of the nature of matter and force with that of the ancient Greek philosophers, and showed how little we have really advanced in our knowledge on these points, notwithstanding the progress made in other respects, and especially in the power possessed by modern chemists of producing an infinite number of combinations of chemical atoms. The distinction between organic and inorganic chemistry, he observed, must soon end, as far as related to the productions of the chemist; but in one respect organic chemistry, as the chemistry of organic nature, would remain distinguished, as that which is associated with vitality. Numerous as were the productions of the chemist, and he predicted that they would become as numerous as the sands of the sea, yet none of these were endowed with life, nor was it within the power of mortal man to produce such. He concluded by referring to the limited extent of our real knowledge upon many points, and consequently the wide field still open for investigation and the discovery of truth.—*Pharm. Journ.*

Great interest was excited by the appearance of M. Dumas in London. Many Anglo-French students recollected his lectures at the Sorbonne, and remembered with what enthusiasm they were received. The secret is the beauty of his style, his accuracy either in experiment or language, and his knowledge of the subject about which he treats.

Graham, John, one of the original members of the Chemical Society, was a younger son of the late James Graham, Esq., of Ballewan, Stirlingshire. He was born in 1812. After serving some time as an articled clerk to Mr. Ker, accountant in Glasgow, he applied himself to the study of chemistry, under the guidance of his brother, Professor Graham, then connected with Anderson's University. On the recommendation of the late Charles Macintosh, F.R.S., Graham early obtained an appointment as chemist in the

well-known print works, of Thomas Hoyle & Sons, Mayfield, Manchester, in which he afterwards became a partner. Dr. Dalton was on intimate terms with the members of this house. Later in life, Graham erected new print works, in conjunction with Mr. John Kennedy, at Heywood, near Stalybridge; he enjoyed the friendship of the late Walter Crum, James Thomson, of Primrose, Clitheroe, and John Mercer; and, in common with these gentlemen, did good service in the application of chemistry to calico-printing.

The practice of bleaching was also much improved in his hands. With reference to the bleach-works of Messrs. Hoyle, which were situated at Dukinfield, within a few miles of Ashton, he used to relate a curious incident:—On visiting the works one day, he found everything at rest. The foreman stated, in explanation, that by long experience he was satisfied that they could not bleach when the wind was in the north-east; and that it was needless to try it, for the goods were infallibly covered with white spots when they came afterwards to be dyed. This was true, and on inquiry, the mischief was traced to small crystals of sulphide of iron, which were carried by the wind in question from the chimneys of certain distant works in which a highly pyritous coal was burnt.

Graham conducted a series of elaborate experiments on the relative evaporating power and economy of boilers of different forms, upon which he communicated a paper to the *Manchester Memoirs*. After having retired from business, in somewhat delicate health, he was induced, in 1861, to take charge of the issue of the new bronze coinage from the Mint. By this successful operation, the copper coinage of the United Kingdom has been improved in quality, doubled in quantity, and a balance of profit, amounting to £350,000, has at the same time been added to the Exchequer. On the demise of Professor Brande, three years ago, Graham was appointed his successor in the Coining Department of the Mint. He died on the 22nd of February, 1869.—*Journ. Chem. Soc.* (Abstract).

Herapath, William Bird, was the eldest son of the late William Herapath, of Bristol, the well-known toxicological chemist. For some years he assisted his father in the laboratory and medical school. Having studied at the Bristol Medical School, and London Hospital, he took his M.B. degree in the University of London, in 1844, with honours in six different branches; and seven years later, graduated M.D. He was a member of the Royal College of Surgeons, and fellow of the Royal Societies of London and Edinburgh. In 1851, he discovered the peculiar optical properties of the crystals

of iodo-quinine sulphate, which have received the name of Herapathite, and which he proposed should be used as artificial tourmalines. In 1857, he published a paper on the "Cinchona Alkaloids." His last printed paper was on "The use of the Spectroscope and Micro-spectroscope in the Discovery of Blood-stains and Dissolved Blood." During the summer of last year, when his health was fast failing, he devoted as much time as he could spare from professional calls to the application of spectroscopic observation, to the investigation of the chlorophyll of various plants, the unfinished results of this labour being yet unpublished. He died on the 12th of October, 1868, at the age of 48.—*Journ. Chem. Soc.*

Jones, Peter, late of Norton Folgate, was born in the year 1808. He was in his youth a student at the Birkbeck Mechanics' Institution, where he was remarkable for his attachment to the pursuit of natural history, especially botany, and where he also acquired a knowledge of mineralogy and chemistry. Having passed through his period of studentship, he became a lecturer on chemistry, in which he attained considerable success, having lectured at the Marylebone Institution, at the Metropolitan, at Salvador House, and other literary and scientific institutions. He afterwards established himself in Norton Folgate as a scientific and manufacturing chemist, and commenced business by a series of conversaziones at his house, which were rendered attractive by the exhibition of objects of natural history, and by Mr. Jones's familiarity with the use of the microscope in the investigation of such objects. He was a fellow of the Royal Microscopical Society, to which he was elected on the 12th of December, 1860. On the 20th of June, 1861, he was elected a fellow of the Linnean Society. He died rather suddenly of angina pectoris, on the 15th of March, 1870, in the 62nd year of his age.—*Proc. Linn. Soc.*

Schönbein, Christian Friedrich, was born October 18, 1799, at Metzingen, in Würtemburg. At 14 years of age, he was apprenticed in a chemical manufactory at Böblingen, where he remained seven years, and devoted his leisure hours to the study of science. In 1820, he obtained a position in the chemical manufactory of Dr. Dingler, the editor of the well-known *Dingler's Journal.* While there, he pursued his studies in chemistry, mathematics, Latin, and philosophy. Shortly after this he went to Hemhofen, near Erlangen, where he directed the chemical factory of a Mr. Adam. Frequently visiting the university town of Erlangen,

he soon became an intimate friend of Pfaff, the professor of physics and mathematics; Schubert, the professor of zoology; and the well-known philosopher, Schelling. He entered the university of Tübingen in 1821, where he studied under the Professors Gottlieb, Gmelin, and Bohnenberger. From Tübingen he went to Erlangen, where he completed his university education. After this, he was for a short time teacher of chemistry and physics at a college in Thuringia, and then came to England, passing one year in Epsom, in an educational establishment there, and one year in London. In 1827 he went to Paris, where he attended the lectures of Gay-Lussac, Ampère, Despretz, and Thénard. In 1828 he received a call to the university of Basle, and in 1829 was made honorary doctor by the faculty of philosophy. In 1835 he became professor *ordinarius* of physics and chemistry, a position he held until his death, the only change being that in 1852, when a special professorship for physics having been created, he retained the chair of chemistry. Though the publications of Schönbein possess a very considerable amount of scientific interest, yet it may fairly be said, that it was by his discovery of ozone, in 1839, that he attained his high position among the savants of the day. The peculiar odour perceptible during electric discharges had been already noticed under several circumstances, and Schönbein himself had paid some attention to it; but it was on the occasion of the meeting of the British Association at Birmingham, at which he was present, that the battery of Mr. Grove was first seen by him, and at once riveted his attention, as being likely by its powerful action to afford the means of furnishing this odorific principle in sufficient abundance for investigation. Having, with the aid of Messrs. Watkins, constructed such a battery of much larger dimensions than any made before, he very shortly succeeded so far with his experiments as to feel himself justified in announcing the discovery of ozone. The similarity of the chemical properties of ozone with those of the peroxide of hydrogen led Schönbein to submit this substance, like many other peroxides, to his peculiar mode of examination, and the results which he derived from these researches developed his theory of the polarization of oxygen, according to which this element occurs in three different states, namely, as ordinary inactive oxygen, ozone, and antozone.

In intimate connection with the history of ozone stands Schönbein's discovery of gun-cotton, which in consequence of its application to photography, and by virtue of being a powerful explosive has become one of the most important chemical substances. Schön-

bein died at Sauersberg, near Baden-Baden, on August 29, 1868.—*Journ. Chem. Soc.* (Abstract).

Though out of date we cannot pass by the death of Sir James Simpson, Bart. His contributions to medical and pharmaceutical literature were incessant. He was *daily* on the track of something new, not courting novelty for its own sake, but as an advance in the progress of the art he loved. He may fairly be remembered for his *gigantic* power of labour, as well as for the manner in which he adorned his profession. Next year we hope to say something of his career, which may prove of interest.

Also in this record, must be mentioned with affectionate remembrance, Mr. R. B. Giles, father of the well-known pharmacist at Clifton; a man of venerable aspect, with winning manners, and one whom children loved. We have an impression that he began life with the narrowest resources, and that he was a typical representative of what industry can effect. Dating his career before the general awakening with regard to abstract study and intellectual culture, he has left it a point of honour to his descendants, with their ampler opportunities, to achieve the same measure of success. He lived long enough to entertain not the slightest anxiety upon the subject.

Von Graefe, Albrecht. This celebrated physician and oculist, was born in Berlin in 1825, and was the son of an eminent surgeon. After finishing his academic studies, he spent some time in England in company with Prof. Donders, of Holland, and returning to Berlin, established the Ophthalmic Hospital, now so celebrated. In 1853, in connection with Arlt and Donders, he founded the *Archiv. für Ophthalmologie*, to which he continued to his death an active contributor. His great discovery was that glaucoma, or disorganization of the eye-ball, could be arrested by iridectomy. The *Lancet* says of him: "There can hardly be, either in Europe or America, a community of 10,000 persons which does not contain at least one individual who is in the enjoyment of vision that has been preserved by iridectomy, and who if Von Graefe had not lived would now be unable to see the sun." As a physician he owed much of his success to a combination of suavity and firmness of manner, and, like Simpson, was followed to the grave with profound regret by a wide circle of friends and patients.

It is scarcely possible to those who have not resided in Berlin to estimate the singular respect in which this oculist was held. House proprietors were affected by his death, as many strangers took apart-

ments in the German capital simply to avail themselves of the services of this physician. He was besieged by his patients, and it is doubtful if any other practitioner has ever been more popular or successful.

NOTICE OF A LIVING PHARMACIST.

Henry Deane, F.L.S.

First President of the British Pharmaceutical Conference.

"I applied mine heart to know, and to search, and to seek out wisdom, and the reason of things."—*Eccles.* vii. 25.

I was born at Stratford, in the parish of West Ham, Essex, near London, on the 11th of August, 1807. My parents, Moses and Elizabeth Deane, being members of the Society of Friends, I was brought up in that persuasion, and continued a member thereof until my marriage in 1843. For nearly the first eleven years the only sound instruction I received was from my beloved parents. Although I was sent to what was considered a good day-school, in the immediate neighbourhood, I have a most distinct recollection of its utter inefficiency as a place for communicating even the merest rudiments of knowledge, and it was not until my father sent me to a large Friends' school at Epping, conducted by Isaac Payne, that I had the slightest idea of what it was to be systematically taught, and to know the value and pleasure of learning. Unfortunately my father's means were not such as to enable him to keep me long at school, and I was removed at Midsummer before I was fourteen years old, and just at a period when I began to like and understand my daily task. In after-years I have felt how much was lost to me by this early removal from mental training. Nevertheless, during this time seed was sown and friendships formed which materially influenced my after-life.

Amongst my schoolfellows were Henry and Edwin Doubleday, who have since attained a world-wide notoriety as entomologists. Their father was fond of collecting birds and insects, and the sons happily followed his tastes; they in their turn communicated the same to many of their companions, myself amongst the number. Moreover, I was occasionally favoured with an invitation to go home with them to tea, occasions which were highly prized as affording opportunities for seeing their collections and illustrated books of natural history.

From collecting insects, collecting plants and drying them—without regard to names, but for their intrinsic beauty—seemed naturally to follow. Thus habits of observing the beauties of creative wisdom were early fixed in my heart, and I often look back with thankfulness to that now far distant day when my friends the Doubledays sowed that seed which was to keep out many temptations to evil, and prove such a lasting source of pure enjoyment. I have ever since advised all my young friends to adopt a hobby calculated to improve the mind, and, by acting as a counterpoise to our natural tendency to indulge in sensuous pursuits, to keep the devil at a respectful distance.

From the time I left school, in 1821, I was four years in a state of untraining. My father's business was neither suited to my taste nor physical constitution, and I did but little in it. This state promised to be ruinous to my best interests in life, and perhaps would have been so but for the close friendship my father held with John Gibson, one of the firm of Howard, Jewell & Gibson (now Howards & Sons), whose eldest son and I were great friends and constant companions. I had the run of their laboratory and premises, and thus gained a predilection for manufacturing chemical pursuits. My investigations were a frequent source of annoyance to our maid-servant, whose proper domain was invaded by experiments with explosive compounds and fetid gases.

When I was about sixteen years old, my kind friend, John Gibson, gave his son, myself, and another youth, who was our frequent companion, tickets for a series of lectures on Natural and Experimental Philosophy, which were delivered by a once-assistant in the house of Allen & Hanburys, at Plough Court, at the Mathematical and Philosophical Society's rooms in Crispin Street, Spitalfields. This course comprised the elements of physical science as then known, including mechanics. The latter I have ever since looked upon as the best foundation of all other knowledge, and I should like to see it form a part of our regular pharmaceutical curriculum. The lectures were admirably delivered and illustrated, and sank so deeply into my mind that I can, at this distant day, recall most of the beautiful illustrations put before us. This was one great saving and turning point in my life, which led to an increasing thirst for knowledge. Parkes's Chemical Catechism was placed in my hands, which I read through two or three times to my permanent advantage, as I soon practically discovered.

At the age of eighteen I was apprenticed, for three years, to a chemist and druggist at Reading, Joseph Fardon, who had served

his time to my uncle Shillitoe, of Tottenham, and who afterwards lived three years with John Bell & Co., in Oxford-street. This well-known pharmacist was a kind, indulgent, considerate friend and master, and while with him I learned to powder alum, ginger, and nut-galls; to grind and mix paints; polish the shop scales, counter and bottles; open and shut shop, and many other things now, unfortunately, considered *infra dignitatem* in this generation. I had to open shop, summer and winter, at six in the morning, a practice which I continued with my own hands for many years after I came to Clapham *without losing the respect or confidence of any one of my customers.* To me activity was a necessity, and I rather liked these tasks than otherwise, and I saw no indignity in performing duties required by my master, which were in their nature not only honest, but calculated to improve me in the knowledge of my business. For while grinding prussian blue or powdering roots and seeds, I pondered over their physical constitution, and afterwards read up their natural history in, my then incomparable book and best friend, Thomson's Dispensatory. This habit of doing anything that was required of me was not only of immediate benefit to myself, but in after-years probably rendered me more apt in teaching those placed under my care, and certainly gave me an idea of the nature and requirements of our trade in country places, such as London itself could not afford.

From that time my motto has been—as I believe it ever was in practice—"There is nothing beneath the dignity of a man that is not dishonourable." Not unfrequently have I had to carry a dozen or two of sodawater to a distance of one or two miles on a hot summer's day, and these occasions afforded opportunities for looking after plants. I shall never forget on one of these excursions finding a fine plant of henbane, a plant I had never seen before, but which I recognised at once from the description read in Thomson's Dispensatory. I took it home and made some extract, much to my own satisfaction, but my master would not have it used, it was so unlike the black stuff regularly dispensed; mine was of that pleasant green colour now well appreciated.

In addition to the real love I had for my business, there was one strong inducement to stick unflinchingly to my duties which was ever borne in mind. I knew I should have to get my living by an occupation deliberately chosen by myself, and paid for by my father, though with the humble fee he could but ill afford. Both parents would probably grow old, and the day might come when it would be my duty and privilege to provide for their declining years. An

amount of honest pride was also a strong stimulant to exertion in acquiring knowledge. When I first entered on my duties behind the counter I was a tall fellow six feet high, and could look over the heads of my master and his assistant. Consequently many of the customers presumed I knew more in proportion to my size, and asked me questions about things of which I had never heard, and which made me blush in utterest confusion. This state of ignorance was most distasteful, and I resolved to have an answer ready for the next inquiring customer. Thus I soon gained a reputation for more knowledge than I felt I deserved. My master's small library was soon exhausted, and my shilling a week pocket money, and other small pecuniary presents were chiefly devoted to the purchase of such standard works, directly or indirectly relating to pharmacy, that my limited means would reach. At that time there was nothing in the English language published for the benefit of those following our particular business. This was very remarkable, seeing that Fellows of the College of Physicians were entirely dependent on the chemists and druggists as dispensers of their prescriptions, and for their success in practice. However, in London and some large towns in the country, a few of the most intelligent chemists did the larger portion of the dispensing, to the exclusion of those who would not or did not take sufficient pains to acquire the right kind of knowledge, or who could not resist the temptation to use inferior or sophisticated drugs compounded according to formulæ well known at that date, but now rapidly becoming obsolete.

I ought, perhaps, here to bear testimony to the exertions of the late Thomas Herring, who was the first, I believe, to introduce pharmaceutical preparations of such excellence and elegance as had never before been offered to the trade. In fact, they were a rapid stride in advance, and by many druggists were looked upon with suspicion. Ultimately the old system was broken down by his innovations; and we, of the present day, have much for which to thank him.

After I was out of my time at Reading, I was fortunate enough to get a situation at John Bell & Co's, in Oxford Street, when I soon found that I was unacquainted with the practical duties of a large business, and I sometimes wished the floor to open and swallow me up, so ashamed was I that such a big fellow should know so little. However, "*Labor omnia vincit;*" I stuck to my early resolution of never allowing any one to feel dissatisfied for want of a proper answer, and I read a variety of useful books at every opportunity, carefully avoiding politics and novels. All this was heavy work with my

average daily labour of fourteen hours. I was much encouraged by the friendship of both the late Jacob and Frederick Bell; to them, or rather to their memory, I owe a deep debt of gratitude for their many acts of consideration for my faults, and the opportunities placed in my way for improvement. One inestimable boon I must specially mention—their allowing me to attend a course of lectures at the Royal Institution, by Faraday and Brande. This was a great privilege, and not one to be slighted. Never shall I forget the clear and impressive manner of both those great men. They were perfect each in his own way; but Faraday cannot ever be forgotten for his simple eloquence and unfailing success in all his experiments. His kindly, earnest, and impressive manner conveying in every word the evidence of truth, made an indelible impression on my mind and all who heard him.

Between my first entry into the establishment in Oxford Street, and my ultimately leaving it, there was an interval of about two years, during which I was at home endeavouring to manage and improve the business of my father, who had become paralysed, and incapable of attending to it. There I continued some time after his decease. I was in Oxford Street altogether about five years, and had become greatly attached to it, both on account of friendships formed and the many privileges enjoyed, when a circumstance occurred which rendered it needful for me to leave. John Bell had an excellent library which was accessible to the assistants; but as yet there was nothing specially written for chemists and druggists, and this want was the frequent subject of conversation between Jacob or Frederick Bell and myself, and we more than once suggested the formation of a society adapted, not only for mutual improvement, but with a view to the general improvement of the whole body of chemists and druggists. It was not, however, till some time after I had left, and was in business on my own account, that Mr. Hawes's Bill stirred up the general body, and gave rise to the formation of the Pharmaceutical Society.

In the autumn of 1837, I took the business now occupied by me at Clapham, assisted by several friends, but more especially by the late Richard Hotham Pigeon, whose large pecuniary aid, afforded in the most liberal and trusting spirit, was supplemented by the advice of a judicious parent. This step was looked upon as certain failure, but my friend Pigeon and the minority encouraged me with better hopes. Besides, had I not my dear mother and sister with me, entirely dependent on my success? My own mind never wavered; I was not afraid of work, and I knew how to live on bread and cheese,

with no stronger drink than a cup of tea or a glass of water. Providence favoured me in a most wonderful manner, and my best hopes were more than realised, so that in a very few years I was out of debt, and prospering to my heart's content.

In 1841, on the establishment of the Pharmaceutical Society, I became one of its first members, but took no active part in its formation. In 1844, I was requested to become one of the board of examiners. After a little hesitation, I accepted the honourable post, a step which I have never regretted. It afforded me large means of self-improvement, and at the same time brought me in contact with men, the value of whose friendship I cannot express in words. The same may be said of my connection with the council, upon which I was elected in 1851. In 1840, the Microscopical Society was formed, and my friend Frederick Bell and I joined it on the foundation. I invested £10 in a microscope, and began work investigating and mounting objects with great ardour. This instrument did not long please me, and I got the basis of a better and more complete one, with which in 1845 I made the remarkable discovery of the existence of *Xanthidia* and *Polythalamia* in the grey chalk of Folkestone, a bed below the common white chalk. It is well known that the white chalk is chiefly made up of the *débris* of the shells of *Foraminiferæ* —a fact first brought to my notice by the late Dr. Pereira—and that the layers of flints, supposed with strong reason by Dr. J. S. Bowerbank to be the fossilized condition of ancient sponges, contained a great variety of the organisms called *Xanthidia* and *Polythalamia*. I looked carefully in the chalk itself for the *Xanthidia* without success, but found them freely distributed in some portions of the grey chalk in which flint in layers, like those of the white chalk, do not exist, but in which occur occasional masses of chert, showing abundant evidence of the structure of sponges without, so far as I could detect any evidence of *Xanthidia*. The *Polythalamia* in this grey chalk were in a very remarkable condition, showing what appeared to be the investing membrane of the shells and the bodies in a truly fossilized but not silicified condition. The species seemed to be identical with those found in the white chalk. Another curious fact seemed to me to be brought out, namely, the mode of distribution of the silica in these two kinds of chalk. In the white chalk it chiefly exists in the form of layers of flints, in the other it is distributed in minute grains or crystals. I also discovered in a fucus (?) prepared as an article of diet in China or Japan, an abundance of a beautiful silicious organism occasionally found in Ichaboe guano, and which, in a notice read to the society, I named *Arachnoidiscus*

Japonicus, forming the basis of a genus of great beauty, and deservedly popular amongst amateur observers with the microscope.

The distribution and exchange of these and other objects of interest with members of the society led to the most friendly intercourse with many excellent men, to whom I am greatly indebted for kindly feeling, and for hints in the art of observing and mounting objects, thousands of which I have had intense pleasure in distributing. It is almost invidious to name one good friend without naming others, but it would be unjust not to mention Mr. Bowerbank's open weekly evening meetings at Islington, where anyone with a desire for knowledge was ever welcomed, with or without personal introduction. Frederick Bell and I went thus, were kindly welcomed, and had our first lesson in observing with a good microscope. So began what little skill I possess in the use of an instrument which for full thirty years has afforded me an inexhaustible source of elevating and unalloyed pleasure. My microscope led to a most friendly intercourse with the late Dr. Pereira, and some of the illustrations in the edition of his Materia Medica, in progress and unfinished at his decease, were made from objects prepared and mounted by myself.

The first meeting of the new society that I attended, was at 338, Oxford Street, when I read a short and very indifferent paper on "Displacement" (*Pharm. Journ.*, vol. i., p. 61), as a method of preparing tincture, etc.; yet, poor as it was, I believe it set many chemists experimenting and working at that method of preparing tinctures and extracts. The process has since that time become more completely understood, and consequently more successful. My next contribution was "Experiments on Senna" (vol. iv., p. 61), noticed by both Dr. Pereira and Dr. Royle, subsequently many smaller ones of no great value until those on opium preparations and extract of meat, the chief merit of which is due to H. B. Brady, without whose ready pen and pencil their interest would have been very small.

When I took my place at the board of examiners, I found that very efficient arrangements had been made for conducting the examinations (I believe by Mr. P. Squire, of Oxford Street); and although not so efficient as they afterwards became under energetic care and ordering, they were fully up to the acquirements of the students. The tables were well supplied with specimens of all kinds, fresh plants, drugs, and chemicals, but as yet there was no practical dispensing. I am quite satisfied that although not so systematically conducted as they are at present, the examiners arrived at a correct estimate of the qualifications of those who presented themselves.

One striking fact was constantly noted for many years, that the larger number of the best qualified men were those who had acquired their knowledge in the country, without those special advantages afforded to those who attended the lectures and laboratory at the establishment in Bloomsbury Square. This was the case for several years after the institution of examination; but it is notorious that these first men have now taken their proper place as leaders amongst their brethren in pharmacy.

The examinations for many years did not occupy many hours on each occasion; the number of examiners was small, and they were conducted *con amore*, without fee other than that afforded by a good conscience: "and all for love, and nothing for reward." Of late their onerous duties have wisely been remunerated; and it is the concurrent testimony of all that they are discharged with strict impartiality.

I was elected on the council in June, 1851, and almost before I had taken my seat, Mr. John Watts, of the Edgware Road, proposed me as vice-president, which extraordinary proposition was at once carried, and I was enthroned at the lower end of the table. Thomas Herring was president. The following year, 1852, Mr. Joseph Gifford was elected president, and I again vice-president. In 1853 and 1854 I was president, and underwent the severe ordeal of the prosecution by Mr. Dickenson, from which the society ultimately emerged victor.

In 1854, the College of Physicians applied to the council of the Pharmaceutical Society for aid in the preparation of a new Pharmacopœia, and a committee was formed to assist in this object. As president, I was chairman of the committee, and at the special request of the chairman of the Pharmacopœia Committee of the College of Physicians, Dr. F. Farre, I retained that position, as the medium of communication between the two bodies until the Royal Medical Council was appointed, and took proceedings to form a national Pharmacopœia. Our services were no longer required; but I may state that when we entered upon our duties we resolved to do what we could to promote the formation of a national Pharmacopœia, and for this object Mr. Squire's admirable book, "The Three Pharmacopœias," afforded a means of comparison, and a basis of operation.

Dr. Redwood was our efficient secretary, and performed many experiments as circumstances suggested. I made many hundred of experiments between the meetings, which were seldom held oftener than once a month. Once a week would not have been too frequent,

but council, committee, and examinations already occupied a large amount of time, which few of us could afford to sacrifice. I can safely say that during the six years I held these responsible positions, one-fourth of the time was entirely taken up in the service of the society.

This service of twenty-six years has been a service of love, a kind of second bride, and during that time, being fully aware of my deficiencies, I trust I have laboured with some degree of success to promote the great object set on foot by my late valued friend, Jacob Bell, to stimulate the mental energies of our young men, and to institute a system of education which should fill the void which had hitherto existed. How far my colleagues and I have been successful it is not for us to know, but another generation will develope the truth and pronounce a verdict.

Here ends the autobiography for which the readers will assuredly thank the writer.

What will some of the younger generation, who fear to let the breath of heaven wake them too early in the morning, think of a few passages in this simple narrative? May we be allowed to supply a slight omission, and show how anatomy was learnt in a certain Oxford Street establishment? Stimulated by the advice of the patriarch of Clapham, a good manual was purchased. One assistant, who happened to be off duty, turned lecturer for the time being, and got up his subject theoretically. But there is a skeleton in every house, and in this firm the particular one upstairs was useful—consequently the young anatomist was able to correct his theories by actual observation. The pharmacist whom just now we wish to honour, was tall and strong, hence it was his duty to bring down the specimen of decayed humanity, which he effected in the same manner as the pious Æneas rescued his father under perilous circumstances. What follows—shall we recapitulate? Earnest study, a hand-to-hand battle for the necessities of life—we do not gloze over facts—the support of a mother and sister, strong inducements for endeavour: success, and a newly created business rising like the Phœnix from more than the usual supply of ashes; lastly, the consolidation of a pharmacy, firmly planted, financially prosperous, and elegantly appointed. Then we hear of scientific papers, some of which are mentioned here, and others are described in a report on the Royal Microscopical Society. (*Pharmaceutical Journal*, vol. x. s.s., No. 1). The readers and writers of such papers get together, they know the value of study, and love knowledge passionately for

its own sake. They are unwilling to shut out others from these *advantages* and pleasures, all the more as their life, in its commencement, was hard and uninviting. So thus, and for this reason, springs up a society proffering with liberal hand solid instruction and encouragement—two novelties; foremost amongst these men, spite of his modest reservations, was the subject of this sketch.

Long may he remain to read these concluding paragraphs; many a time and oft may he be seen amongst his fellow-examiners, oscillating between extracting the deep secrets of botany, and talking like a father to the students; years to come may his presence gladden the British Conference, and there let him demonstrate with his invariable happiness that he has not forgotten to be young.

And we who write these lines cannot refrain from confessing how great an honour we feel it to be allowed to aid in arranging this brief account of one whom our own father taught us to hold in reverence. Most surely we express the heartfelt sentiments of all, when we say how infinitely more we delight to offer a laurel wreath to his living excellence rather than a hundred immortelles to his memory.

BIBLIOGRAPHY.

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Des Bases Organiques Naturelles et Artificielles, au point de vue Chimique, Phisiologique, et Médical. Thèse par le Dr. Ate. Lacote. Pharmacien de 1re classe. Montpellier: 1869.

The etymology of chemistry, *la chimie*, is given as χυμὸς, the juice of plants. The first efforts of research were directed to the discovery of an universal panacea; transmutation of metals followed; yet these guesses after truth are not to be despised, since nitric acid was discovered *at Montpellier* by Raymond Lully; sulphuric acid, aqua regia, antimony, arsenic, zinc, phosphorus, ammonia, and ether, formed part of their investigations. Alchemy, however, and Paracelsus but paved the way for nobler efforts, and the disciples ofthe Spagyric art worked out more sensible results. *Spagyric* is thus defined, σπὰν and ἀγείρειν, *i.e.*, analysis and synthesis.

Afterwards, Béguin discovers calomel; Glauber, hydrochloric acid, kermès, and sulphate of sodium; Nicolas Lefebre and Lémery began their career; Humbert discovered boracic acid, Klaproth reproduced precious stones, and one of the Rouelles was the instructor of Lavoisier. Then came Wenzel and Scheele; the first born in Dresden, and the second, a poor Swede, died aged 44. These and others, as Descroizille, Cadet, Chaptal, Proust, Vauquelin, and Courtois, who discovered iodine, were pharmacists.

"Here we shall stop," exclaims the author, "for we should fear being accused of flattery in speaking of our contemporaries. Only we would have it remarked, that the great question of the organic bases is almost entirely due to the labours of pharmaceutical chemists, and that Derosne, Robiquet, Pelletier, and others, by the discovery of the alkaloids, have given to medicine new arms of assured power which it brings to the work day by day."

The essay on Organic Bases is divided into five sections:—1

Natural Alkaloids. 2. Artificial Alkaloids. 3. General Properties of these Organic Bases. 4. Physiology and Therapeutics. 5. Toxicology.

So vast is this field of investigation that preliminaries must be omitted. Pelletier and Caventou set to work on nux vomica, and eliminated strychnine, which was first called Vauqueline. This appellation was changed at the request of Thénard and Gay-Lussac, who considered that a name so dear should not be associated with so rank a poison. It need not be stated that the guillotine is so called after one of the most amiable French physicians. Brucine followed, then curare with its alkaloid curarine; the study of the cinchona alkaloids may be passed over, except one remarkable sentence; "Robiquet, malgré l'autorité de Pelletier et de Caventou, émet l'opinion que la quinine est peut-étre de la cinchonine unie à quelque principe encore inconnu. Il fut bientôt forcé de se rendre à l'évidence, et désormais il fut aquis à la science que le quinquina jaune et le quinquina gris contenaient deux alcaloïdes différents." Had Robiquet lived to read the East Indian Report on Chinchona, he would have found himself not altogether wrong.

Veratrum sabadilla, *Veratrum album*, and *Colchicum autumnale* were examined. Delphine (*Delphinium staphysagria*) was described in 1819. From that date a long list of organic bases was investigated, details of which are given in manuals bearing on the subject, and reproduced in this tractate. It should be stated that this is the successful essay at the Concours pour l'Agrégation (Section des Sciences et Chimiques) at the School of Medicine at Montpellier.

The following table is of interest.

Opium Alkaloids.			
Characteristics.	Morphia.	Codœia.	Narcotine.
Taste	Very bitter	Bitter	Slightly bitter.
Solubility in Water	Little	Soluble	Little.
Solubility in Spirit	Soluble	Soluble	Soluble.
Solubility in Ether	Insoluble	Little soluble	Soluble.
Nitric Acid	Blood-red colour	Nil	Red colour, with a drop of Sulphuric Acid.
Persalts of Iron	Blue	Nil	Nil.
Iodic Acid	Decomposes Acid, and sets Iodine free	Nil	Nil.
Sulphuric Acid and Binoxide Lead	—	—	—

	Strychnine Alkaloids.		Liquid Alkaloids.	
Characteristics.	Strychnine.	Brucine.	Nicotine.	Conicine.
Taste.	Extremely bitter	Bitter . .	Acrid. . .	Acrid.
Solubility in Water	Insoluble . .	Insoluble .	Very soluble	Floats on the surface.
Solubility in Spirit	Insoluble in weak Spirit	Soluble in weak Spirit	Very soluble	Very Soluble.
Solubility in Ether	Soluble . . .	Soluble . .	Very soluble	Very Soluble.
Nitric Acid. . .	Yellow . .	Blood red, Violet with Proto-chloride Tin .	Orange Yellow with gentle heat . .	*Topaz* colour unaffected by heat.
Persalts of Iron .	,,	,,	,,	,,
Iodic Acid . . .	—	—	—	—
Sulphuric Acid and Binoxide Lead .	Beautiful violet colour . .	—	—	—

Chemistry: General, Medical, and Pharmaceutical, including the Chemistry of the British Pharmacopœia. A Manual on the General Principles of the Science, and their Application to Medicine and Pharmacy. By John Attfield, Ph.D., F.C.S. New edition. Van Voorst, 1869. A third edition now being published by Henry C. Lea, Philadelphia, is adapted to the United States Pharmacopœia.

From text-books having a similar object it differs in three particulars:—first, in the exclusion of matter relating to compounds which at present are only of interest to the scientific chemist; secondly, in containing the chemistry of every substance recognised officially, or in general practice, as a remedial agent; thirdly, in the paragraphs being so cast that the volume may be used as a guide in studying the science experimentally.

Practical toxicology, the chemical and microscopical characters of morbid urine, urinary sediments, and calculi, and tables to aid in the detection of impurities in medicinal preparations are included. Appropriate questions follow each section. The index has been made so comprehensive as to render the volume a special book of reference for medical practitioners and pharmacists.

We observe with great satisfaction that manuals of this class, such as Fowne's Chemistry, Bentley's Botany, and the present work, though originally compiled for the students of the Pharmaceutical Society, have become universal text-books in the medical schools of Great Britain and America. Attfield's Chemistry, besides being perfectly adapted for general reference, contains all that class of information which would thoroughly fit the student for his minor

and major examinations. Attention is directed to the Saturation Tables, which are included in the volume.

Chemistry, Outlines of; or, Brief Notes of Chemical Facts. By William Odling, M.B., F.R.S., etc., 8vo, pp. 568. London: Longmans, Green & Co.

The student of chemistry who strives to obtain a record of the facts and arguments placed before him in the lecture-room may be easily deluded by the belief that his written notes are intellectual acquisitions. He fills page after page with formulæ and figures, but in grasping at the shadow of knowledge he probably loses the substance. While he should be learning, he is merely collecting materials with which he vainly imagines he can reproduce the lesson at any future time. Notes, however, seldom recall the lucid explanations of the lecturer, and the student finds, too late, that although he has bricks in plenty, the mortar needed for binding them together is wanting. Many eminent teachers have condemned the practice of taking notes, and we agree with them in thinking that the light which ought to reach the mind of the student is often intercepted by his note-book.

Dr. Odling has produced a book which will convert many habitual writers of notes into attentive listeners. It consists substantially of the notes from which he has lectured for the last seven years at St. Bartholomew's Hospital, and it gives a connected outline of the leading facts of chemistry in their relations to each other. It is essentially descriptive in character; and aims at calling to mind, in as few words as possible, the ascertained origins, properties, and metamorphoses of the chemical substances to which it refers. The author states that it is not intended for study by itself, but as a companion to the teachings of the lecture-room, and as an aid to the appreciation of more complete works, such as Miller's Elements and Watts's "Dictionary." To bring a vast collection of facts into the smallest possible compass, Dr. Odling has adopted condensed forms of expression, which contrast strangely with the easy-flowing sentences of his Manual. But though we miss the author's elegant style in this book, the systematic arrangement of facts, and the suggestive collation of formulæ constantly remind us that we are examining the work of one of the clearest thinkers of our day. With such a book for reference, the chemical student can safely discontinue the practice of taking full notes of lectures. Any one page out of the 468 to which the "Outlines of Chemistry" extend, might be extracted to show the condensed nature of the contents,

but our readers must study the work to appreciate properly its systematic arrangement.

Chinchona.—(*East India Chinchona Cultivation*). Return, ordered to be printed, August 9, 1870, being the correspondence between the Secretary of State for India, and the Governor General, and the Governors of Madras and Bombay, relating to the Cultivation of Chinchona Plants, from April 1866 to April 1870.*

Précis.—The Emperor of Mexico requested a supply of chinchona seeds grown in India to be sent to him, in order that the cultivation of that tree might be carried on in his dominions. Parcels of well developed seeds of *C. succirubra*, and *C. officinalis* were desired.

In order to carry out the object contemplated by the British Government to introduce the chinchona into India, particularly the making its produce accessible to the greatest possible number of the poorer inhabitants of the country, cultivation on the part of private individuals was recommended, government officers being specially advised to lend encouragement. It was also deemed requisite that a competent analyst should be appointed for a commencing period of three years, and that Mr. Howard's proposal for reporting should be adopted. Professor Frankland proposed Mr. John Broughton his assistant at the Royal Institution, Albemarle Street, as quinologist, who was therefore chosen at a salary of £1000 per annum, exclusive of outfit and expenses for apparatus. He was to work in concert with the superintendent of chinchona cultivation, Mr. McIvor, and to keep himself in communication with the medical authorities. Chinchona alkaloids other than quinine, were to be investigated. A translation from the French of Planchon's pamphlet on Peruvian barks was also circulated. Thus took place

* It seems a matter of regret that some arrangement for the spelling of this word chinchona, or cinchona, could not be adopted. Celebrated quinologists prefer chinchona, because the Countess of Chinchon in 1638 was cured of intermittent fever at Lima, and her physician, Juan del Vego popularised the remedy under her name. The rest of the world, official text-books, and known writers on Materia Medica, spell the word cinchona. Some obscurity rests on the *historical* introduction of the bark. It has been stated that the countess was relieved from her malady by the bark of a tree in which chinchonia, not quinine, abounded. Countess's powder (Pulvis Comitissæ) was a descriptive term soon changed to Jesuits' powder, because Cardinal de Lugo, Procurator General of the order of the Jesuits, recommended the bark to Cardinal Mazarin, firstly from the knowledge of its beneficial effects, and secondly because the brethren of his order began a lucrative trade in South American quina-bark, through the medium of their missionaries. Humboldt gives detailed information on the subject.

the appointment of a resident analytical chemist on the Neilgherry Hills.

The immediate duty was "to investigate the causes which regulate the yield of alkaloids from cultivated chinchona barks, and to ascertain the preparation of the febrifuge which will combine cheapness with efficacy in the greatest degree."

A medical commission was appointed, consisting of Drs. Mackenzie, Inglis, and Kennedy, to direct a practical investigation of the therapeutic effects of chinchona alkaloids, *quinium* to be included, on the suggestion of Mr. Markham. Tabulated forms were provided.

Mr. Markham sent an elaborate report on the cinchonæ in the Herbaria at Madrid, being the results of an examination of all the specimens in the collections of Pavon and Mutis, and of a careful comparison of those of Pavon, with specimens from chinchona plants now growing in India. Don José Celestino Mutis was (1783) chief director of the botanical expedition to the New Kingdom of Granada. Zea and Caldas were his pupils with many others. 5000 coloured drawings, manuscripts, and dried plants, were the results of the expedition. Mutis died in 1808, shortly after a revolution broke out: Morillo, the Spanish general, shot Caldas, burnt the manuscripts, and sent the rest of the collection to Madrid. The specimens are in great confusion.

Number of chinchona plants on the Neilgherries, May 31, 1866, 1,156,070. Number of plants planted out during the month, 2,860. Total number permanently planted out, 249,550. Increase by propagation, 32,494. Number of plants issued to the public during the month, 69—total number distributed, 100,757.

June 26, 1866: 120,000 seeds of *C. succirubra*, 90,000 seeds of *C. calisaya*, and 25,000 seeds of *C. officinalis*, were forwarded to the Mexican Government.

A sample of quinium is still deficient. A case containg eight samples of Neilgherry chinchona bark is forwarded to Mr. Howard for analysis, and reports on cultivation are ordered to be transmitted every half-year.

Howard's Analysis.

C. succirubra. Third crop of bark, renewed under moss.

Crystallized sulphates, per 100 parts	8·45
Alkaloids soluble in ether, viz., chinchonidine and quinine	1·14
Insoluble in ether (chinchonicine)	0·20
	9·79

Mem.—The sulphates (of mixed quinine and chinchonidine) refine well, but do not stand the ether test. Compare this with—

C. succirubra. Original bark, unmossed.

Crystallized sulphates		4·50
Alkaloids soluble in ether		1·71
Insoluble in ether	chinchonine crist 0·40	0·74
	chinchonine 0.34	
		6·95

In connection with the analysis of the two following, Mr. Howard remarks: [Their examination] "discloses a most gratifying success in the excellence of what I conclude to be the predominant variety cultivated in India." (753,272 plants out of 1,123,645 in May, 1866.)

C. officinalis, var. β, *Condaminea* (*Bonplandiana ?*). Second crop of bark renewed under moss.

Crystallized sulphates	6·52
Alkaloids soluble in ether, quinine and chinchonidine	1·35
Insoluble in ether, chinchonicine	0·15
	8·02

Mem.—The sulphate refines well, and stands the ether test.

C. officinalis, var. β, *Condaminea* (*Bonplandiana?*). Original bark, nine months under moss.

Crystallized sulphates	6·66
Alkaloids soluble in ether, quinine and chinchonidine	0·56
Insoluble in ether, chinchonicine	0·15
	7·37

"On the whole, the present remittance of bark is unquestionably the most instructive and the most encouraging that I have had the opportunity of examining from India."

Mr. McIvor's Report, 1865–66.

The maximum monthly increase by propagation has reached 78,725; the number of plants has been doubled in one year.

Number of plants issued to the public, 100,757.

[Bearing in mind the date, these strange figures show the importance of this newly-developed industry.]

The majority of the plants were raised by seed: from one ounce

of seeds from 20,000 to 25,000 plants were obtained. From the imported seeds of *C. calisaya* (Mr. Money) 60,000 seedlings were raised. The crown barks, *C. officinalis* and its varieties rank next to *C. succirubra*, and they are hardy.

The grey barks under cultivation produce quinidine instead of chinchonine.

Chinchona cannot be grown under the shade of living trees, and different species cannot be successfully mixed together. They are a proud family, and will associate with no other than themselves. The aids most favourable for their growth are light and air.

"The most valuable discovery made in connection with chinchona cultivation is the manner in which the alkaloids are formed, how they are deposited, and increase in the bark, how they pass from one into the other, and how they waste, oxidize, or pass into gum or colouring matter."

It was noticed that the deposits of alkaloid were most abundant where they happened to have been covered with moss. Experiments indicated that the alkaloids are first formed in the leaves; that, combined with the sap, they are carried down and deposited in the bark, and most impurely in the liber. As this bark becomes cellular a purer alkaloid is formed; but the outer cellular bark, when exposed, underwent a process of waste which was prevented by covering it with moss.

Therefore in the leaves of the plants is a never-ceasing quinine-producing power, and a constant counterbalancing waste in the surface of the bark. This fact changed the whole system of chinchona cultivation: leaves became sacred, and there was an obvious method of protecting bark.

The effect of mossing is to increase the alkaloids from $2\frac{1}{2}$ per cent., to 15 or 20 per cent. "Moreover, mossing more than doubles the bulk of the bark, thus making the direct yield of alkaloid per acre fully thirty times the quantity that can be procured under any other treatment. But this is a small advantage compared with the great one mossing affords, by enabling us to secure a yearly harvest of bark without damage to the plants or arrest of the quinine-producing properties. By mossing every twelve or eighteen months, the entire cellular bark of the stem can be removed with facility and without injury."

One acre under this method will yield annually three hundred times as much alkaloid as can be produced by any other plan.

Convict labour has most successfully been employed; the occupation on these plantations is extremely healthy, and the men on the

expiration of their sentence, commonly settle down with their families as free labourers.

The number of acres under government cultivation was at the date of this statement 673.

Mr. Ballard now applies (for the second time) from Malabar to have plants to be gratuitously distributed amongst the natives, and Mr. McIvor is instructed to send 500 to Wynaad, with plain directions capable of being translated into the vernacular. Others followed the example, but Mr. McIvor thought that this gratuitous distribution was a doubtful good ; small care was likely to be bestowed on acquisitions so readily obtained.

A storm passes over the tranquil scene. Mr. McIvor quarrels with Lieutenant Nichol of Neddivuttum ; much unpleasantness results, and it is determined in future that government sanction must be obtained for dismissal from service on chinchona plantations.

Report of the Chinchona Commission. February 28, 1867. 1145 cases of fever were treated by the alkaloids as follows :—

Sulphate of Chinchonine	410
„ Chinchonidine	359
„ Quinidine	376
	1145

Medium doses of from 8 to 10 grains were most successful. "The evidence, so far as it has come before the commission, does not go to show any particular superiority of one alkaloid over another.

"The main conclusion which the members of the commission have derived from the data before them, is that the alkaloids hitherto but little valued in medicine, are scarcely, if at all, inferior as therapeutical agents to quinine. The differences [in physiological and therapeutical action] will most likely be found to be of degree, rather than of kind ; and practically, so far as the wants of India are concerned, it will be just as well that the locally grown barks yield a large proportion of one alkaloid as of another."

Mr. John Broughton goes out to India, visits the chinchona plantations, and decides upon Ootacamund as his sphere for conducting operations. Neddivuttum, first recommended, proved lonely ; the damp would affect delicate instruments, and the higher mean temperature would be a disadvantage in experiments requiring ether and other volatile liquids. Permission is given to build a laboratory, the roof to be finished before the rains set in ; proper servants are to

be engaged, and a few rooms (not rent free) are to be added. "There are many analytical processes which require to be performed continuously, and a considerable loss of time would ensue by allowing such to cease during the night. My presence on the spot would be economy of time and labour. It is unusual, and indeed somewhat unsafe, to allow a laboratory to be entirely deserted during a great part of the twenty-four hours." Mr. Broughton evidently meant business.

Our young quinologist was hampered by the want of chemical apparatus, nevertheless he prepared a preliminary report, confirming Pasteur's idea that sunshine was injurious to bark while drying, and offered an explanation of the value of the mossing process; but further information being desirable, four samples were forwarded to Mr. Howard for analysis.

Mr. McIvor sends an elaborate report for 1866-67. In this he emphatically repeats the statement, "The more the plants are exposed to light and air, the more robust is their growth, and greater the deposit of alkaloid." He also describes the *Sudden death of the Chinchona*. "On examining private plantations, it was found that many fine plants were destroyed by earth being washed down, falling, or being thrown around the stems of the plants in weeding." A fungus, specially in wet weather, attacks the bark, and plants of three or four year's growth are destroyed in a few days. To avoid this, put the plant on a hillock cut out from the side of the hill, with a drain of a few inches cut around on the hill side. This will prevent the wash of earth around the stem. The details of Mr. Howard's numerous analyses are familiar to all quinologists.

895 acres were now under cultivation. More reports and analyses follow when Mr. Broughton asks permission to investigate the surrounding districts, so as to see how far the preparations of chinchona may be made on the spot. He proposes a small manufactory, to be increased as circumstances demand.

The Chinchona Commission decided that there was not much appreciable difference between the various chinchona alkaloids. The Countess of Chinchon herself (according to Howard) was cured by chinchonidine. For years the latter was not effectually separated from quinine during the process of manufacture. Their chemical composition is very similar. Pareira bears the same testimony; then why not precipitate the sulphates of the mixed alkaloids? Mr. Broughton also suggests the precipitation of the alkaloid in an amorphous state, and a liquid preparation containing 12 grains of the disulphate of quinine in one ounce. The government consented

to these proposals, gave him a travelling allowance, interpreter, and letters of credit to the collectors of Coimbatore, Malabar, Salem, and to the commissioner of Mysore. [Let us mention that amorphous quinine is a very old preparation; that years ago it was made by the students at Bloomsbury Square, and that at that time it and similar preparations met with signal neglect.]

Mr. Broughton starts on his journey. Results as follows:—

Lime.—There is no true limestone in the Neilgherries. That for building purposes is derived from the deposit called "kunkur." With care it may be employed for chemical purposes. Mean analysis of the admixture of several nodules:—

Silica	7·54	Sand and clay.
Oxide iron	2·65	
Alumina	2·06	
Carbonate lime	82·32	
,, magnesia	3·02	
Oxide iron	1·72	
Organic matter and loss	0·69	
	100·00	

Soda.—There is a large supply in surface earth, called "soudoo." This has been already analysed. Three samples are given.

YIELD OF DRY CARBONATE OF SODA.

1. Taken from a heap of earth, a dhoby was collecting . 7·0
2. Collected with care . . . . . 12·6
3. Collected with all possible care . . . . . 26·6

The natives use it in soap making, dying, and glass making. The analysis of soudoo, is as follows:—

Sand and insoluble matter	74·92
Carbonate of lime	10·70
Sesquicarbonate of soda	8·41
Sulphate of soda	1·24
Chloride of sodium	1·02
Water	3·27
Nitric and nitrates	traces
Organic matter and loss	0·44
	10·00

Pearlash.—The wood ashes examined gave results:—

Mean specimen of ash from a burning Neilgherry shold	15·0
Ash of the woodfell of Ootacamund	14·5
Ash from a Madras locomotive (damaged by exposure)	4·8

Magnesia.—Deposit of magnesite occurs in seams in the gneiss rock. The mineral is white, and looks like porcelain. Two analyses—

	Prinsep. 1836.	Broughton. 1868.	
Magnesia . . .	48·34	47·29	No source of magnesia at all approaching this in purity exists in England. English magnesia comes from magnesite from Eubœa.
Carbonic Acid . .	51·66	51·53	
Silica	—	1·18	
	100·00	100·00	

Alcohol.—This at present must be supplied from the Commissariat Department. The native preparation is remarkable. They add to the hot solution of jaggery, chips of the bark of *Acacia leucophlea*, hence it is sometimes said erroneously that native spirit is made from acacia bark. The *rationale* of the process is this:—Jaggery contains albuminous and other nitrogenous substances, which soon putrefy and make the spirit nauseous. The acacia, rich in tannin, combines with these substances, and by rendering them insoluble entirely arrests their decomposition. The addition of the bark infusion increases the yield of the amount of spirit by one sixth. But Mr. Broughton is a philosopher—"For manufacturing purposes, however, I would prefer spirit of as nasty a taste as possible, in order to discourage thieving."

The commission (aided by additional members) to examine the different alkaloids of chinchona, furnish a second report—it is remarkable, and tends to upset our previously formed convictions. Four alkaloids were selected for trial: chemically pure sulphate of quinine, sulphate of quinidine, sulphate of chinchonidine, and sulphate of chinchonine. Briefly enumerated, the result was—

Total Number of Cases Treated by the Four Alkaloids.	Cured.	Failed.
2472	2445	27

Ratio of failures per 1000 cases—

Chemically pure Sulphate Quinine	7·092
Sulphate Quinidine	6·024
,, Chinchonidine	9·925
,, Chinchonine	23·255

"The subjoined table gives the aggregate percentage of cases [treated], and may be accepted as affording a fair therapeutical value of the alkaloids in the treatment of fevers;—

	Number of Persons Treated.	Number of Cases in which less than 20 grs. checked the Paroxysm.	Number of Cases which required 20 grs. and upwards.	Percentage of	
				Cures with less than 20 grs.	Cures with 20 grs. and upwards.
Quinine Pure . .	416	320	96	76·92	23·07
Quinidine . . .	412	312	100	75·72	24·27
Chinchonidine . .	323	242	81	74·92	25·07
Chinchonine . .	385	282	103	73·24	26·75

If these figures are allowed to convey instruction they will surely bear out the verdict of the commission.

"In reviewing the whole of the operations for testing the therapeutical effects of the chinchona alkaloids, the result confirms generally the favourable opinion expressed last year; and likewise conclusively establishes beyond doubt, that ordinary sulphate of quinine, chemically pure sulphate of quinine, and sulphate of quinine possess equal febrifuge power; that sulphate of chinchonidine is only slightly less efficacious; and that sulphate of chinchonine though considerably inferior to the other alkaloids, is notwithstanding a valuable remedial agent in fever."

Mr. Broughton applies for a larger supply of chemicals, and desires to establish a small experimental laboratory. Permission is obtained.

We now come to the official report by Mr. McIvor for the year 1867–68. Striking exemplification is given of the value of mossing. "The bark of *C. Pahudiana* (a species hitherto considered as worthless) has, under this process, increased in its yield of alkaloids from 0·761 to 2·21 during the year 1867. A large extent of grass land was brought under cultivation, and the *C. officinalis* seemed to flourish. It was thought, therefore, that the whole plateau of the Neilgherries might be utilised, and these valuable trees might successfully be planted.

So great, however, appears the advantage of definite chemical examination, that M. Delondre, of Paris, is requested to give his opinion on the barks; Delondre and Howard undertaking to ascertain and fix the principles which should guide this important work. Convicts are still engaged, and their conduct is satisfactory: specially some utterly bad characters take to their duties in good

earnest. Hospital arrangements are commenced, and the enterprise is by no means on the wane, as this table may tend to prove.

Date, April, 1867, to April, 1868.	Total Number of Plants Propagated.	Total Number Permanently Planted out.	Total Number of Plants Distributed to Private Individuals.
	2,353,370	740,912	170,740

One effect was immediately produced: there ceased to be a demand for chinchona plants; private persons read McIvor's "Notes on Chinchona Cultivation," and learnt the art of propagating from the seed.

"Upwards of 100 ounces of chinchona seeds have already been distributed to the public from this establishment [Ootacamund], and as each ounce of seeds should produce 20,000 young plants, these seeds would furnish the enormous number of 2,000,000, a number more than sufficient to meet the requirements of all private planters; and we are still distributing seeds to all applicants, therefore the demand for plants by the public may be considered to have ceased."

The Botanical Gardens shared the energetic offices of the government superintendent. Amongst successful introductions were (*Exagonium purga*) jalap, *Convolvulus scammonia*, *Aralia papyrifera* (Chinese rice-paper plant), and *Phonium tenax* (New Zealand flax). The pampas grass failed, but was replaced by the *Arundo conspicua*, or New Zealand sedge.

Mr. Broughton's analysis of Indian jalap compared with a good specimen of commercial, is not discouraging.

"The active medicinal principle of jalap consists in its peculiar resin, and the comparative amounts of this substance can be thus stated.

Indian grown Jalap.		Specimen of Commercial Jalap.
Tuber 1	11·0 per cent.	11·0 per cent.
,, 2	10·6 ,,	
,, 3	11·2 ,,	

Mr. Broughton's Report, August 17, 1868.

Not less than an additional yield of three quarters per cent. in the trunk bark of the oldest parts of the plantations of *C. succirubra*.

Mean of analyses of samples of the Crown bark from trees $4\frac{1}{2}$ years

old, and collected with a view to obtain numbers that would fairly represent the mean yield of the barks of *C. officinalis*.

Total alkaloids	4·40	per cent.
Total sulphates	3·10	,,
Quinine	2·49	,,
Chinchonidine and chinchonine	1·91	,,
Crystalline sulphate of quinine obtained	2·49	,,
Ditto ditto chinchonidine	0.70	,,

"Frequent analyses made of the red barks during the last eighteen months have clearly shown that the yield of alkaloids varies according to the seasons of the year. The ratio that the amount of quinine bears to the other alkaloids appears also to vary."

The Crown barks grown at the higher elevations of the Dodabet plantation seem to surpass those grown at the less altitude of Neddivuttum in their yield of quinine. Crown barks should not be cultivated at a lower altitude than 7000 feet.

The effect of *mossing* might probably be due to the exclusion of light. Two experiments were therefore tried: one with trees covered with tinned plate, and the other with trees covered with black cloth. The effect produced does not appear satisfactory. The chinchonidine and chinchonine were increased, but the quinine seems, if anything, to have suffered. "There thus exists a strong array of concurrent evidence, pointing to the conclusion, that it is to the destructive effect of isolation being prevented that the richness in yield of the mossed bark must be ascribed." Taking the total tabulated yield, this is true taking it separately, the contrary transpires. Mossing and the exclusion of light do not seem to form an equation. The whole table is subjoined; one tree was covered with a shield of tinned plate, the other with black cloth.

	Tree Covered with Tinned Plate.		Tree Covered with Black Cloth.		
	Original Bark.	Bark after 10 Months' Protection.	Original Bark.	Bark after 6 Months' Protection.	Bark after 10 Months' Protection.
Total Alkaloids.	5·29	8·10	5·04	6·91	7·92
Quinine	2·16	1·65	2·26	2·03	2·34
Chinchonidine and Chinchonine	3·13	6·45	2·78	4·88	5·58

We now come to a most important matter. The renewal of the bark, in Mr. Broughton's opinion, is not the consequence of the covering with moss; this may facilitate regrowth, but the bark under ordinarily favourable circumstances is replaced without external treatment. So we may note with accuracy successive formations, and this table is of extreme interest.

C. Succirubra.

The Alkaloid of reforming Bark is mainly Quinine, that of the original Bark it replaces, is in great part Chinchonidine.	First Series.		Second Series.	
	I. Original Bark.	Ia. Renewed Bark 6 Months old.	II. Original Bark.	IIa. Renewed Bark 10 Months old.
Total Alkaloids . .	5·4	5·3	5·27	5.03
Quinine	1·7	4·4	1·81	4·02
Chinchonidine and Chinchonine . .	3·7	0·9	3·46	1·01
Crystallized Sulphate of Quinine	1·75	1·56	1·78	2·20
Do. Chinchonidine	Undetermined or Traces.			

The opinion of authorities as to the principal seat of quinine in the bark has been divided. Weddell, Wigand, Schleiden, and others, entertain the theory that the alkaloids are situated in the liber. Howard states that they reside in the cellular portions of the bark external to the liber. Mr. Broughton, having great facilities for examination, gives the following table.

	First Series.		Second Series.	
	Liber.	Cellular Portion.	Liber.	Cellular Portion.
Total Alkaloids . .	5·94	7·98	6·85	8·00
Quinine	0·70	2·25	0·85	3·25
Chinchonidine and Chinchonine . .	5·24	5·74	6·00	4·75

Bark under moss showed similar results.

Ammonia was found present in every specimen of bark examined.

Report, McIvor, January 31, 1869.

Total number of plants permanently planted out, 894,057; increase by propagation, 175,000; monthly average, 29,166; total, 2,571,770. Number of plants distributed to the public, 110; total distribution, 170,850. 67½ ounces of seeds have also been gratuitously distributed, making the total quantity 206½ ounces. These figures should be compared with previous reports.

Mr. Ballard, determined not to let adverse circumstances prevail, makes another application for distribution of Chinchona plants in Wynaad; these are to be sent in little caskets containing about three pounds of soil; each plant to have three or four inches growth. Those sent formerly were too little advanced, not for skilful planters, but for the natives with whom he had to deal. With utter honesty he relates that he went on a tour of inspection; 400 out of 500 plants had perished by neglect or ignorance. Nothing daunted, he perseveres; and it is with much satisfaction that we quote the following: "With reference to the last paragraph of the letter, the Board request that the superintendent Government Chinchona Plantations, may be instructed to forward another supply of the red-bark plants to the collector."

Opinion of the Secretary of State for India, July 29, 1869.

"The eventual success of any attempt to spread the cultivation [of chinchona] among the natives of a particular district, depends mainly on the interest that may be taken in the matter by the local officers." Nothing can be more true that this; and now the Resident in Travancore and Cochin gives his report. Dr. Cleghorn and Mr. Markham (Dec., 1865), visited Peermade, the Government Garden, called also Peerméde. The former states, "the result of the chinchona experiment is more successful here than anywhere else in Southern India, excepting on the Neilgherries." What follows is by no means peculiar to this district. "The planters at Peermade do not appear to doubt the suitability of the climate, soil, and situation, but they are not satisfied that the cultivation will be financially remunerative to private individuals, and consequently exhibit no desire to undertake it." Great apathy was manifested by the planters; trees offered gratis were neglected.

No one can read even these mere abstract accounts of the constant endeavour, by cultivation, by accurate analysis, by various experiments,

and unceasing industry to develope the growth of the chinchonas, without feeling certain that such efforts must eventually be crowned with success. We enter now upon a new page of this history. Mr. Broughton already (Sept. 22, 1868) directed his attention to some plants, few in number, which seemed to promise large results. He suggests, therefore, that the authorities should not hastily plant their available space, but allow room for further experiment. Of *C. succirubra* there was enough; *C. calisaya* was deserving of attention; while the varieties of *C. Pitayensis* had not been fairly tried. Lastly, his lanceolate-leaved kind, just discovered, raised from seeds collected in the Loxa district, rich in quinine, and in some instances giving a yield threefold that of fine Bolivian calisaya, might not improperly be placed under high cultivation. One analysis only is quoted: a good specimen, $9\frac{1}{2}$ feet high, and equal in size to an average tree of *C. officinalis* of same age.

No. 1. Specimen.	New kind.	C. Officinalis.
Total Alkaloids	11·40	3·95
Total Sulphates obtained crystallized	10·51	3·32
Quinine	9·75	1·55
Chinchonidine and a small amount of Chinchonine	1·65	2·40
Quinine Sulphate obtained crystallized . . .	10·13	1·50
Chinchonidine Sulphate	0.38	1·82

"The bark of the above specimens (five) was of capital appearance, and its alkaloids yield crystalline sulphates with much ease. There being no reason to suppose that the cost of the growth of this variety will exceed that of the Crown barks, it may fairly be predicted that bark of the quality No. 1 specimen, yielding a tenth of its weight of sulphate of quinine, must ultimately produce great changes both in Indian chinchona cultivation, and in the European market."—*Broughton.*

Failure in many cases is as instructive as success. Fifty plants had been despatched by Mr. McIvor for trial on the Nulla Mullays.

The ground selected was in a moist locality, with a rich deep soil, at an elevation of 3000 feet, the highest peak being only 3300 feet. The plants were carefully tended, watered, and protected during the hot season, but all died. Again, at Dr. Cleghorn's suggestion, fifty

more were tried. They were well established before the hot season; and when the sun was up they were scorched; and because they had no root they withered away. The climate was too dry, the hot winds too prevalent, and the elevation insufficient.

Report by Mr. McIvor on the Government Chinchona Plantations, Ootacamund, Neilgherry Hills, 1868–69.

These regular statements are indispensable, but of necessity contain a sameness of intelligence. The heavy preparatory works are ended on the different estates, and the whole land sanctioned, 12,000 acres, is in progress of completion. The average monthly increase by propagation throughout the year, is 19,703 against 48,267 of the last year. Private planters now grow from seeds gratuitously furnished, and consequently the sale of chinchona plants has ceased.

The original plants of August, 1862, have attained heights varying from 21 to 24 feet, the circumference of the stems, at one foot above the ground, varying from one foot nine inches to two feet six inches.

Red and grey barks are the most luxurious; Crown barks are the hardiest; red barks, second; grey barks, third; and yellow barks, fourth. *C. succirubra* thrives best at an elevation of from 5000 to 6000 feet—7000 feet being too high. Private cultivation has suffered great discouragement owing to financial difficulties, and though some have persevered, many estates can scarcely find a purchaser. Convict labour has had to be discontinued as it interfered with police regulations—finally a vigorous attempt is made to introduce European fresh-water fish. The government seem disappointed that all the land granted for chinchona cultivation has not been occupied, and the Secretary of State inquires after the fate of the seeds sent from New Granada, collected by Mr. Cross. Mr. McIvor furnishes a tabular statement that most of the seeds were received in bad condition, covered with mildew, and were a failure.

Many short reports from different places follow; on the whole they seem unfavourable to the cultivation of chinchona on a small scale, unsupported by direct government aid. More actual knowledge of the planting and rearing of chinchona appears desirable in outlying districts.

Mr. Broughton sends in another report, Dec. 9, 1869, in which he includes a totally distinct series of observations. Red bark has increased in yield of alkaloid, to a not less extent than 0·5 per cent. The mean percentage of quinine, on the other hand, has diminished;

thus while the total alkaloids, May, 1868—May, 1869 are 6·74—7·43, the quinine stands at 2·40—1·72.

Amount of alkaloid varies with the vigour of the tree, and hence the estimation of annual mean increase in percentage of alkaloid becomes exceedingly difficult to obtain. To illustrate this remarkable difference, the following table is appended.

Difference of yield according to vigour.	Bark from fine vigorous Trees.	Bark from fine vigorous Trees.	Bark from Trees of Mean Growth.	Bark from Trees of Stunted Growth.
Total Alkaloids . .	6·76	6·94	4·34	2·40
Total Sulphates crystallized . .	5·39	5·59	3·60	1·65
Quinine	3·76	3·80	2·18	0·90
Chinchonidine and Chinchonine . .	3·00	3·14	2·16	1·50

Though further cultivation of *C. succirubra* had been thought by our quinologist unnecessary, 100,000 to 150,000 additional trees had been planted. Experiments were now conducted in order to ascertain the occurrence of alkaloid in the leaf. "From 20 lbs. of the leaves of *C. succirubra* I was able to obtain 0·372 gramme of alkaloid, of which 0·153 was quinine. The quinine yielded 0·07 gramme of crystallized sulphate."

C. Succirubra.

	Fresh Leaves.	Dried Leaves.
Total Alkaloids	0·0035	0·0111
Quinine	0·0016	0·0080
Chinchonidine and Chinchonine . . .	0·0025	0·0110
Quinine in crystal	0·00078	0·0037

The leaves, therefore, are of no practical use as a source of alkaloid; many pounds of leaves would be required to be equal to a dose of quinine. The bitter taste is owing to quinovin, which is under medical trial. The mode of drying is too lengthy to be described; but the result is, that fresh bark is preferable to the dried, but that

with due precaution little injury need result. Bark should be quickly dried at an ordinary temperature, as *in vacuo* over lime or sulphuric acid; at any rate as rapidly as possible, and without prolonged exposure. A high temperature such as steam heat should be avoided; the alkaloids are associated in the bark with "quino-tannic acid." This under moderate heat absorbs oxygen, and forms a compound difficultly decomposed by acid. The old fact occurs, that bark-drying should not be effected in the sunshine (this is said, be it recollected, of an Indian sky); still it may be managed, "that while the action of light is reduced to a minimum, the conditions of short exposure and moderate temperature may be fulfilled." From other considerations it is thought that the bark harvest might extend between November and May.

Interesting as any other point yet discussed is the order of the formation of the alkaloids. The first product will not crystallize; afterwards it becomes crystalline, and is converted into quinine. Chinchonidine appears at a later stage. Chinchonidine is therefore due to an alteration of quinine, though as yet one has not been artificially changed into the other; hence rapid growth favours quinine; trees stunted and quiescent are sure to be comparatively rich in chinchonine. Analyses of *C. succirubra* for the first 17 months of its natural renovation, without any artificial protective:—

	Four Months.	Six Months.	Ten Months.	Fifteen Months.	Seventeen Months.
Total Alkaloids	4·30	5·3	5·03	6·00	5·47
Quinine . . .	4·20	4·4	4·02	3·03	3·65
Chinchonidine and Chinchonine	0·10	0·9	1·01	2·97	—
Sulphate Quinine	0·25	1·56	2·20	2·30	3·12
Sulphate Chinchonidine . .	—	—	—	1·13	1·24

Liebig in 1840 advanced a theory that the alkaloids are the substitutes for the mineral bases, which are the constituents of all plants, and which constitute the larger portion of the ash obtained when the plants are burnt. The alkaloids possessing the same general properties as these mineral bases, and comporting themselves in, chemically, so similar a manner, were thought to have identical

functions. Mr. Broughton offers this important observation: "The results [of experiment] have convinced me that the relations of the organic to the mineral bases is by no means so simple as the hypothesis assumes. The contradictions are numerous. Trees growing under similar circumstances may have the same amount of mineral constituents, while their organic bases are as 1 : 2. The general distribution of the mineral bases is quite similar in chinchona to that which obtains in other trees yielding no alkaloids; and what is still more important, I find that trees grown for two years in a soil made artificially calcareous have not shown any difference either in their yield of alkaloid or amount of ash."

Two analyses, showing the effect of drying, must be noticed.

Red Bark.

A are the amounts yielded by Fresh Bark.	A.	Dried at 17° C. in Vacuo.	Dried at Steam heat.	Dried in current of Air at 35°–45° C.	Dried in Sunshine.	Dried in Sunshine slowly.
Total Alkaloids . .	6·89	6·67	5·92	6·64	5·90	5·85
Crystalline Sulphates obtained . . .	6·12	5·98	5·31	5·89	5·28	4·78
Comparative amounts of Acid required to neutralise the Alkaloids . . .	13·20	13·10	11·8	13·10	12·00	11·60

Now look at the effect produced in some barks by exposure to a temperature of boiling water with access of air.

		A.	B.
A, analysed while fresh.	Total Alkaloids	3·52	1·93
	Quinine	2·48	1·03
B, after three days' exposure to steam heat.	Chinchonine and Chinchonidine	1·04	0·90
	Quinine Sulphate obtained .	2·46	0·88
	Chinchonidine Sulphate obtained	0·66	0·56

It must be borne in mind, that this peculiar insoluble compound,

giving rise to the above apparent loss of alkaloid, is decomposed by the action of alkalies; and the missing alkaloid can thus be in part recovered.

Hopes have been often entertained that the *Hymenodictyon excelsum* might prove a source of quinine; the tree is indigenous to India, and is so similar in appearance to the chinchonas, that it has been called *Chinchona excelsa*. Its bitter principle was discovered to be identical with æsculin, which on keeping was converted into æsculetin, and lost its bitterness.

The plant was not considered worth cultivation so long as the chinchona alkaloids could be obtained.

Here ends this section entitled, "Papers relating to the Cultivation of Chinchona Plants in India." Ootacamund was not to have the monopoly: Darjeeling shared in the enterprise.

The conclusion drawn by Mr. Howard on analysis was: "there is no reason to think the Darjeeling barks at all inferior to those grown at Ootacamund; the difference of climate does not appear to have much effect on the alkaloids therein contained.

No. 1 Darjeeling.		Ootacamund.	
Quinine crystallizing freely as Oxalate	3·20	Quinine (specimen of the White Sulphate sent) .	3·14
Chinchonidine and a little Quinine	2·27		2·06
Chinchonine	0·61		0·80

Mr. Howard receives further samples for analysis, but intimates that he cannot devote either the time or labour to become analyst for all India. The cases are respectfully returned, and the assistance of paid, competent persons recommended.

Here then we cannot do better than leave a subject which by no means is exhausted. The reader need scarcely be referred to the splendid contributions to the chemistry and literature of the chinchonas furnished so often by John Eliot Howard. His publications are, of necessity, costly and beyond the means of some whom most specially we desire to interest. It is right that pharmacists should be made acquainted with the outlines of this great industry; they verge upon the romance of pharmacy. There is a hope, neither visionary nor presumptuous, that ere long these alkaloids may be

placed within the reach of the highest functionary and of the humblest peasant.

Their manufacture will benefit mankind and largely develope trade; for the days of expensive remedies, shrouded in mysterious formulæ, are ended.

Chinchona (the spelling of the report is adopted), taking the word in its widest acceptation, may rank in importance with the old discovery of opium and the opiate series, and with the modern revelations of chloroform and the anæsthetics. What may be the future of these bark alkaloids it is impossible to tell; one of the brightest pages of their history already we are allowed to read.

Pharmacopœa Austriaca. Editio sexta. Vienna: 1869.

This work has been frequently reviewed, and it is interesting as a very late exposition of continental teaching. It also deserves praise from its instructions being conveyed in that concise and elegant Latin which it seems we do not appreciate; we have, therefore, selfishly restricted our pharmaceutical knowledge to the learned in modern languages, and to the inhabitants of our own little island. Some few formulæ may be mentioned as distinctive.

Acid. Hydrochloric. dil. *Spiritus salis acidus.*

℞ Acid. Hydrochloric	1
Aquæ Dest.	1

Sp. gr. 1·06

Acid. Nitric dil. *Aqua fortis.*

℞ Acid. Nitric	5
Aquæ Dest.	6

Sp. gr. 1·13

Acid. Sulphuric dil. *Spiritus Vitrioli.*

℞ Acid. Sulphuric	1
Aquæ Dest.	5

Sp. gr. 1·117

These differ from preparations of the same name used in continental practice.

Pulvis Doveri. *Pulvis Ipecacuanhæ cum Opio.*

℞ Pulv. Rad. Ipecac., Pulv. Opii	āā 1
Sacchari	8

Infusum Laxativum. *Aqua laxativa Viennensis.*

℞ Fol. Sennæ Alexand.	25
Aquæ communis fervidæ	200

Infuse a quarter of an hour. Dissolve in the strained infusion

Mannæ electæ	35

Many recipes bear the same name; the formula of the Paris Codex is generally followed.

Linimentum Ammoniatum. *Linimentum Volatile.*

℞	*Ammoniæ*	1
	Ol. Olivæ	4

Species Athææ. *Emollient Tisane.*

℞	Fol. Althææ	20
	Rad. Althææ	10
	Rad. Liquiritiæ	5
	Flor. Malvæ	2

This should be called *tisane de Proteus*, as it appears in so many forms. Lastly the true receipt is given for Paraguay roux.

℞	Spilanthi Herbæ	4
	Rad. Pyrethri	2
	Sp. Vini	12

Digest, express, and filter. The spilanthus is somewhat difficult to obtain, but the genuine odontalgic tincture is far superior to its numerous imitations.

Pondus Austriacum Medicinale.

Libra	continet	uncias	12 =	420·014	grammatibus.
Uncia	,,	semiuncias	2 =	35·001	,,
Semiuncia	,,	drachmas	4 =	17·500	,,
Drachma	,,	scrupulos	3 =	4·375	,,
Scrupulus	,,	grana	20 =	1·458	,,
Granum			=	0·0729188	,,

The regulations and general notes are short and extremely sensible. Medicines of dangerous character require a mark of caution on the physician's prescription (†) before they can be dispensed; the sign (!) marks an unusual dose; and in case of doubt, the dilute preparation of the Pharmacopœia is to be preferred to its concentrated form.

The grain and ounce weights have been abandoned, and the decimal system substituted. A commission has been appointed by the Minister of the Interior to introduce this change. It would be interesting to know with what success. Another commission of physicians and apothecaries was formed to settle the prices of the substances newly introduced into their Pharmacopœia. It should be added that elaborate botanical descriptions accompany the section usually denominated materia medica.

SOME PAPERS ON PHARMACY, READ BETWEEN JULY 1869 AND JUNE 1870.

1869, *OCTOBER.*

INTRODUCTORY ADDRESS.

HENRY DEANE.

NOVEMBER.

HISTORICAL NOTES ON MANNA.

D. HANBURY.

A curious Discussion on Artificial Manna followed.

PULVIS CRETÆ AROMATICUS, AND LAC AMYGDALÆ AMARÆ.

A. F. HASELDEN.

The object of the author in referring to the first of these subjects was to show that the present substitute for the old aromatic confection, when made, as ordered in the pharmacopœia, with the saffron and spices in powder, is more grateful and aromatic than when made, as it has been suggested it might be made, with infusion of saffron and the essential oils of clove and nutmeg. The latter mode of preparing it was proposed as a means of producing the sort of bright yellow powder which wholesale druggists supplied for pulvis cretæ aromaticus ; but the author considered it preferable to use the powder as ordered in the pharmacopœia, although the colour of this powder may not be so bright as the other. He stated that the bright yellow powder, although it gives out its colour more quickly, does not give more colour than the other, nor indeed quite so much, when the latter is carefully rubbed with water.

In referring to the second subject, the author desired to show that lac amygdalæ amaræ, which was generally made with blanched bitter almonds, might be equally well made from the almonds unblanched, if they were first washed with a little cold water.

Professor Redwood read a communication from Mr. Beardsworth

on syrup of iodide of iron. The mode of making this syrup has been frequently discussed during the past year. The subject was revived at the last conference.

LIQUOR BISMUTHI.

GEORGE F. H. MARKOE. (*American.*)

The writer has been called upon to prepare this solution quite frequently, and in considerable quantities, and after a careful trial of all the published formulæ for its manufacture, has found some objection to all of them. The writer cheerfully acknowledges his indebtedness to Mr. N. Gray Bartlett, to whom we owe the first good working formula given in the *Am. Journ. Pharm.*, Jan., 1865. Mr. Albert E. Ebert, in the same journal, Jan., 1866, gives an improvement on Mr. Bartlett's process, by which he avoids the use of crystallized citrate of potassa, and forms the citrate of bismuth by adding citric acid to the nitrate of bismuth, and then adding hydrate of potassa, by which means citrate of bismuth, is precipitated and nitrate of potassa is obtained in solution, and is got rid of by washing the bismuth salt on a filter. Ebert's process is a good one, indeed the best one that has been published, and the only objection the writer has to it is the use of caustic potassa to neutralise the nitric acid. The idea of adding the citric acid to the solution of nitrate of bismuth, must in justice be credited to Mr. Thos. P. Blunt, who first suggested it in the *Lond. Pharm. Journ.*, May, 1865.

The objections to caustic potassa are, that great care must be used to avoid an excess, from the fact that citrate of bismuth is freely soluble in potassa, and thus involves a loss of bismuth if any excess happens to be used; caustic potassa is a very troublesome chemical to keep in good condition, being very prone to attract both moisture and carbonic acid from the atmosphere, by which means it becomes in a great degree unfitted for use. It is a difficult matter to get caustic potassa free from carbonate, and still more difficult to keep it so, even if free from this impurity when the bottle is first opened. Another objection is that caustic potassa is expensive.

The following modified process offers a substitute for the caustic potassa that gives excellent results. This substitute is well crystallized carbonate of soda, a salt that can at all times be obtained of good quality at a very low price. Citrate of bismuth is less

soluble in carbonate of soda than in caustic potassa, hence a gain is made by using the former.

The process is the following:—

℞	Subcarbonate of Bismuth	one troy ounce
	Citric Acid (in powder)	420 grains
	Nitric Acid (sp. gr. 1·42).	1½ troy ounces
	Crystallized Carbonate of Soda	1150 grs.
	Distilled Water	q. s.
	Alcohol	q. s.

Dissolve by gradual addition the subcarbonate of bismuth in the nitric acid, and when the solution is completed dilute it with a fluid ounce of distilled water, add the citric acid, stir until it is dissolved. Dissolve the carbonate of soda in ten fluid ounces of distilled water, and gradually add the soda solution to the bismuth solution, constantly stirring the mixture. After standing for six or eight hours, transfer the mixture to a moistened paper filter, and wash to remove nitrate of soda. Transfer the magma to a mortar or evaporating dish, and carefully add water of ammonia until the citrate of bismuth is dissolved. Dilute the solution with an equal volume of distilled water, and treat a half a fluid ounce (14·7 cubic centimetres) with an excess of sulphide of ammonium, or, better still, sulphide of sodium; collect and wash the sulphide of bismuth on a tarred filter (which has been exposed to the heat of a water bath, previous to being tarred), and heat on a water bath until thoroughly dry; allow the filter and contents to cool under a bell glass over sulphuric acid, and carefully weigh. Multiply the weight of the sulphide of bismuth by the fraction ·908 to find its equivalent in teroxide of bismuth. Apply the same ratio to the remainder of the bismuth solution, and dilute it to such a degree that each fluid drachm shall contain one grain of teroxide of bismuth, seven-eighths of which measure must be made with distilled water, and the remainder with alcohol. The average product of liquor bismuthi obtained in several trials was 51 fluid ounces, being about two per cent. better results than those obtained by Mr. Ebert's process.

DECEMBER.

CULTIVATION OF THE CINCHONÆ UNDER GLASS IN ENGLAND.

JOHN ELIOT HOWARD.

NOTES ON THE PHARMACOPŒIA (BRITISH).

PROFESSOR REDWOOD.

The professor has chosen too simple a title for his explanatory paper. It is a review, rapid certainly, but sufficient, of the more prominent topics which from time to time have been discussed, bearing on our national work of reference. Great difference of opinion necessarily existed, indeed *tot hominum tot sententiæ*.

He stated in a subsequent discussion, that the medical council, so far from wishing to protect the Pharmacopœia from that liberal criticism which, having free expression, might conduce to its gradually assuming a more perfect form, was anxious that such discussions should have every possible freedom and attention. The responsibility of such a body as the Pharmaceutical Society was therefore great. He felt sure that the discussion would be of such a nature as to elucidate many important facts, and yet would not unduly weaken the authority of the Pharmacopœia. He said, we owe allegiance to the Pharmacopœia, and must be loyal to it. Yet the Pharmacopœia has its faults, although we must not magnify these so as to impress those who are inclined to deviate from its instructions. Our present object must be to ascertain the desirability of making any alterations, so as to improve the Pharmacopœia without disagreeing about small matters.

[We cordially and entirely agree with these sentiments, and it is our conviction that the present amended edition of the Pharmacopœia is one of the most sensible books yet issued by the press. It is equally adapted as a work of general reference, and a guide to practical dispensing.]

The great object aimed at was, to elicit further expression of thought on the part of practical pharmacists, and thus by mutual interchange of ideas, to render the British Pharmacopœia, as far as possible, perfect. The main points that had engaged attention were as follows:—

1. In reference to its *language*, which is English, some advocate that it should be written in Latin, in favour of which view there are strong arguments. But it is important that the language of the

Pharmacopœia be explicit and complete, and many modern terms have but imperfect representatives in Latin. The inadequacy of Latin may account for the imperfection of the Pharmacopœias already written in that language.

2. The *arrangement* of the Pharmacopœia. This is supposed to give general satisfaction.

3. In *nomenclature* no great or important changes have been made, yet some are desirable; and new names have been introduced which are explicit, yet do not imply theory. This remark applies specially to chemical compounds. The author expressed his strong opinion that words applied in medicine should not be altered without strong reason.

4. The *notation* has, for various reasons, been introduced in both the new and old forms: this is not now necessary; the new will suffice.

5. The *terms employed for representing proportions* may be either the weights in use, or may be simply numbers representing so many parts. The latter method involves weighing both liquids and solids, and although in use on the continent, would meet with much opposition here.

6. The *method of describing or setting out the formulæ of processes* is a very important point in the construction of the Pharmacopœia. The formulæ should be arranged in such a manner as to readily communicate a knowledge of the ingredients and their proportions. The name of each separate ingredient should occupy a line, and the quantities should be expressed in figures. One disadvantage attending the latter plan is the greater possibility of error in printing figures than words.

The notes themselves alluded to acidum sulphurosum, chloroform, cinchona bark test [Dr. Redwood recommends, that after separation, the alkaloid should be dissolved in sulphuric acid, precipitated with ammonia, dried and weighed], extractum ergotæ, ferrum redactum, green iodide of mercury, white precipitate, linimentum potassii iodidi cum sapone, liquor magnesiæ carbonatis, and a few other substances.

As an addition to the Pharmacopœia, the following preparations were suggested:—

Lactic acid.

Acetic ether: a very agreeable and efficacious preparation; a good solvent for cantharides.

Chlorodyne: it is doubtful what preparation could be found to represent this remedy.

Citrate of magnesia.

Pepsine: a description of the process for the preparation of this substance is now given in the Paris Codex.

FEBRUARY, 1870.

ACTION OF LIGHT ON GASES AND VAPOURS.

PROFESSOR TYNDALL. (*Chemical Society.*)

The lecturer began by remarking that it had, for the last ten years, been his endeavour to make radiant heat a means of getting an insight into the working of the atomic forces, or, in other words, into the state which is called chemical combination. Whilst pursuing his experiments with luminous waves on matter in a finely divided state, he was forced to imagine molecules and atoms; in fact, his belief in the existence of atoms is founded more upon those physical evidences than upon the considerations which are current in the chemical world. If he had to give up the notion of atoms, and to replace that conception by the abstract idea of multiple proportions, he would feel completely at a loss how to account for changes in the physical properties of matter. After these introductory remarks, the lecturer proceeded to the main subject. The apparatus which served to illustrate the statements, consisted of a glass tube about 3 feet in length, and 3 inches internal diameter, closed at each end by glass discs. This tube, after having been exhausted by an air pump, was partially filled with dry air, which had been permitted to bubble through the liquid whose vapours were to be examined. The condensed beam of an electric lamp was caused to pass through the tube from end to end. Since the aim of these experiments is to render visible the chemical action of light upon vapours, substances have been chosen, one at least of whose products of decomposition by light has so high a boiling point that as soon as it is formed it is precipitated. Nitrous oxide gas, the vapours of amylic iodide, amylic nitrite, benzole, etc., mixed with some air which had passed through hydric nitrate or hydric chloride, were found well suited for this purpose. In all cases, no matter what the nature of the vapour was, if it was only employed in a sufficiently attenuated state, the visible action commenced with the formation of a blue cloud, which in some instances was of the deepest azure tinge, rivalling the colour of the purest Italian sky.

When a cell containing some of the liquid whose vapours are to be examined was inserted between the lamp and the tube, no clouds were formed within the tube; the luminous waves traversing the liquid had been deprived of their acting power. When polarized light was sent through the tube, the blue cloud was visible only in one direction—the direction varying according to the position of the Nicol's prism; when the short diagonal of the Nicol was vertical, the blue cloud was seen when the spectator's eye looked horizontally upon the tube, not otherwise; as soon as the prism was turned round its axis, the blue cloud was only seen when the line of vision fell vertically upon the experimental tube.

MARCH.

ARTIFICIAL ALIZARINE.

W. H. Perkin, F.R.S. (*Chemical Society.*)

The author commenced with the history of the various researches which finally have led to the artificial production of alizarine. Alizarine was first obtained from madder-root, by Robiquet and Colin, and investigated by Schunk. Graebe and Liebermann, when submitting alizarine to the action of a reducing agent, found a hydrocarbon, which proved to be identical with anthracene from coal tar. Anthracene having thus been obtained from alizarine, it remained to produce alizarine from anthracene. For this purpose anthraquinone, an oxygenated derivative of anthracene, was treated with bromine, the bromine compound thus formed acted upon with caustic potash, and the potash salt produced by this treatment decomposed by hydric chloride. The product of these successive reactions was alizarine. To turn this discovery to practical account, the bromine required in the process must be replaced by the cheaper oil of vitriol. Artificial alizarine is entirely identical with the natural colouring matter. Both dissolve in caustic alkalies, forming violet solutions of the same tint; when applied to mordanted fabrics they produce exactly the same colours, bearing treatment with soap equally, and resisting in the same degree the influence of light. Lastly, they show identical absorption bands in the spectrum. Still, as a substitute for madder, artificial alizarine has been objected to, on the ground that pure alizarine alone will not produce the madder colours, other colouring matters being yet required. But Schunk

asserts, that the final result of dyeing with madder is simply the combination of alizarine with the mordants employed. A good deal has also been said about the supply of anthracene; it must, however, be remembered, that tar-distillers have as yet but little experience in separating this substance; Mr. Perkin believes that coal-tar contains considerable quantities of this hydrocarbon. No doubt the kind of coal used, as well as the temperature employed in the gas-works, influences the quality of the tar as a source of anthracene, but upon these points no definite information has yet been obtained. Mr. Perkin illustrated his lecture by exhibiting samples of fabrics dyed and printed with artificial alizarine, and also by projecting the spectra of some alizarine solutions on a screen. By producing alizarine from anthracene, Graebe and Liebermann have given the first instance of the artificial formation of a vegetable colouring matter. The way by which the beautiful discovery has been arrived at proves, as the president pointed out, decisively the value of studying the molecular arrangements of chemical compounds.

APRIL.

VANADIUM.

PROFESSOR ROSCOE. (*Chemical Society.*)

This metal was discovered in 1830, by Sefström, and fuller investigated by Berzelius, who assigned to it the atomic weight 68·5, and represented its three oxides by the formulæ VO, VO_2, VO_3. Some years afterwards, Rammelsberg observed that the mineral vanadinite, a double salt of lead vanadate and lead chloride, is isomorphous with apatite and with minetesite, the former containing phosphoric, the latter arsenic acid. This crystallographic analogy would have led to the conclusion that the oxide of vanadium in vanadinite has the formula V_2O_5, agreeing with the corresponding oxides of phosphorus and arsenic, P_2O_5 and As_2O_5. But Berzelius representing the oxide in question by the formula VO_3 was compelled to regard vanadinite as an exception to the law of isomorphism. Professor Roscoe, having come into possession of a plentiful source of vanadium,* determined to endeavour to clear up this anomaly. He soon found

* This source is a by-product obtained in the preparation of cobalt from the copper-bearing beds of the lower Keuper sandstone of the Trias, at Alderley Edge, in Cheshire.

the key to the enigma. He proved that the substance supposed by Berzelius to be vanadium is not the metal, but an oxide; and that the true atomic weight of the metal is 51·3. Thus, the VO_3 of Berzelius really becomes V_2O_5, corresponding to P_2O_5 and As_2O_5. The lecturer went on to demonstrate that the characters of the vanadates bear out the analogy of vanadic acid with the highest oxides of phosphorus and arsenic; and that vanadium, hitherto standing in no definite relation to other elements, must now be regarded as a member of the well-known triad class of elementary substances, comprising nitrogen, phosphorus, boron, arsenic, antimony, and bismuth.

[*The following do not admit of classification.*]

THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The Chicago Meeting.

The seventeenth annual meeting of the American Pharmaceutical Association was held at Chicago, commencing on the 7th of September, and occupying in all four days, and six sessions. We have abstracted from the *Pharmacist*, an ably-conducted periodical published in that city, the following details of such of the proceedings as are of general interest.

Professor Parrish, of Philadelphia (the president of the association) being absent, his place was occupied by the first vice-president, Mr. Ferris Bringhurst, of Wilmington, Delaware. Professor J. M. Maisch, of Philadelphia, the permanent secretary, "officiated." The first business transacted, was the election of sixty-two new members, and the next the approval of the credentials of delegates representing the following colleges of pharmacy:—Massachusetts, New York, Philadelphia, St. Louis, Kansas, Cincinnatti, and Chicago. There were also delegates from the Saginaw Valley Pharmaceutical Association, and from the Alumni Association of Philadelphia College of Pharmacy.

The secretary read a letter of acknowledgment from M. Boullay, of Paris, accepting an honorary membership of this Association, written by himself in his ninetieth year; and also a letter from the distinguished Professor Ehrenberg, of Berlin, in answer to an address sent him by the association, on the occasion of the completion of the fiftieth year of his doctorate.

Proposed Legislation.

The chairman of the special committee, W. Wright, jun., chosen at the previous session to draft a law regulating the practice of pharmacy, to be submitted to the legislatures of the several States, submitted a printed draft of such law. It was handed to the members for examination and discussion during the session.

The following is a synopsis of the proposed law to regulate the practice of pharmacy and the sale of poison, and to prevent the adulteration of drugs and medicines:—

Section 1 requires that all shops kept open for the sale and dispensing of medicines and poisons, shall be under the oversight of a registered pharmacist or assistant pharmacist.

Sections 2, 3, and 4 require that no person shall use or exhibit the title of pharmacist or assistant pharmacist unless registered according to law; that no one can register unless a graduate in pharmacy, a practising pharmacist, or assistant pharmacist; that graduates must be from some college of pharmacy in the United States, or from such institution in a foreign country.

Sections 5 and 6 require the appointment of a Pharmaceutical Board by the governor of each State, and that this board shall examine all candidates for certificates, and cause all prosecutions, and that all members shall pay ten dollars to the board.

Section 8 requires that all registered pharmacists shall furnish their addresses, for which a fee is to be paid. All changes are to be duly sent to the board.

Section 9 imposes a penalty for any false representations in the procuring of registration, by imprisonment from three to twelve months.

Section 10 imposes a fine of fifty dollars (£10) for the offence of selling any drugs or medicines unless he be a registered pharmacist, to be paid to the board.

Sections 11 and 12 authorise the fining of any pharmacist for refusing to comply with the regulations of the board. This is not to interfere with the acts of any practising physician in the line of his profession.

Section 13 imposes a restriction on the sale of any medicines or poisons, unless the name of the same be placed on the bottle, and the address of the seller. It is the duty of all persons so selling to have the address of the person purchasing, and his name, with a statement of the objects such medicines or poisons are to be used for.

Sections 14, 15, and 16 prohibit the adulteration of any medicines, and require that all prescriptions shall be kept in a book for five years. For adulteration the fine may be 1000 dolls. (£20), and imprisonment may be inflicted.

Dr. E. R. Squibb, of Brooklyn, read a portion of his interesting and instructive report on the Pharmacopœia, which was received with much favour. Its further hearing and discussion thereon will occur during the session.

The president's annual address was then read by the chairman, and this concluded the first day's work.

On the following morning, business was commenced at 9 o'clock, and the following resolution was unanimously passed:—"That the faculty of Rush Medical College, of the Chicago Medical College, and the medical profession at large, be invited to be present at our sittings."

The Annual Report.

The annual report of the society was then read by the treasurer, Mr. Charles A. Tufts, and was accepted without debate. The following are the essential parts of the report:—

"All the bills of the association for the past year had been paid, and there was still a balance of 28 dolls. 63c. due on the books of the association. The present number of members was 765, of which number 83 had become members during the year 1868. The total number of contributing members was 607. In consequence of the failure of the members to answer the repeated letters sent them, it was impossible to state the number of life members.

"In 1866, the proceedings had cost 1038 dolls. 15c., and the expenses were 552 dolls. 45c.; in 1867, the proceedings had cost 1508 dolls. 32c., and the expenses 552 dolls. 45c.; in 1868 the figures were 1724 dolls. 47c., and 1065 dolls. 46c. The expenses for the present year will be increased in proportion, and even the payment of the 3 dolls. due from each member will leave but a small margin in the treasury. It is hoped that the members will bear this in mind, and pay up promptly. The report recommends that in future the usual copy of the proceedings be withheld from all who are in arrears, until such arrears shall be cancelled."

The officers of the association for the next year were then elected, Mr. E. H. Sargent, of Chicago, being unanimously chosen president.

Special Reports and Papers.

Dr. Hoffmann, of New York, read the report of the committee on the Progress of Pharmacy. It treats on the following topics :—

1. Sketch of the general progress of pharmacy and collateral sciences. 2. Practical pharmacy. 3. Pharmakognosy, or materia medica. 4. Pharmaceutical chemistry. 5. Pharmaceutical legislation, statistics, etc. 6. Obituary.

In the domain of practical pharmacy a new chapter on secret medicines was introduced, and the analysis of some of them given. The practice in Germany, with regard to the sale of illicit nostrums, was recommended.

Mr. Taylor, of Philadelphia, moved the appointment of a committee of five to report on the specimens now on exhibition. The motion was carried.

Dr. Squibb, of Brooklyn, then read the continuation of his voluminous report on the revision of the Pharmacopœia. Some discussion followed regarding the sweeping reduction of the materia medica list; the report was accepted, and referred to the executive committee.

A discussion arose as to whether the ordering of the report to be printed carried with it the endorsement of the convention. It was decided not, and that the report stood only on its own merits as an individual report.

An invitation received from the management of the Rush Medical College, to visit that institution, was received and accepted by the convention.

On the afternoon of the same day the association met again, and Dr. Squibb, of New York, read a paper on Rhubarb. The writer spoke of the decreased cost and improved quality of the article. He exhibited several samples of his own preparation, believed to be wholly free from any deleterious admixture. It was strongly urged that no drug be purchased in a powdered state.

Dr. Squibb read a paper on Collodion, by Mr. F. C. Musgiller.

The list of queries was then read. Few of those who had accepted them were ready to report. Query eight was the first taken up, and read as follows :—

Query 8. What kind of glassware is, on the whole, best adapted to shop furniture? What shapes are to be preferred for salt-mouthed and tincture bottles, and what kind of dispensing and prescription bottles are best? with practical remarks upon the glass manufacture in its bearings upon pharmacy. Accepted by Thomas S. Wiegand, of Philadelphia, who read a paper on the subject.

Query 9. Whence are the corks of commerce derived, and where are they cut? with general observations upon the commercial history of corks and corkwood.

Mr. P. W. Bedford, of New York, read a paper upon the subject. The commerce flourished almost exclusively in the south-western portions of Europe, more particularly in Spain. The corkwood was grown in Algiers and Australia. It had been attempted to cultivate the cork oak in California and in the southern States, but without great success, as some twenty-five years was required before the young tree was ready for use. The main trade now was from Spain and Portugal. The method of curing was briefly touched upon, and also the amount and value of the trade to New York. The speaker denied that the quality of the corkwood received was deteriorating. It varied greatly, however, in quality, as the prices abundantly indicated. The corks were cut in the hamlets near the region where the wood is grown. Previous to 1855, all corks were cut by hand, but now the work is done by machinery.

Query 10 was taken up. What strength of alcoholic *menstrua* is best adapted to the officinal gum resins with reference to producing permanent preparations less incompatible with aqueous diluents than the present officinal tinctures? Accepted by Alfred B. Taylor, of Philadelphia, who read a paper upon the subject.

Query 11. Which of the preparations of the late edition of the Prussian Pharmacopœia are preferable to like preparations in our own; and what new drugs and preparations in that standard should be transferred to the United States' Pharmacopœia, out of regard to the numerous German practitioners in the United States? Accepted by F. Victor Heydenreich, of Brooklyn, who recommended the partial adoption of the Prussian preparations.

Query 12. What are the sources of asphaltum of commerce, now so largely used in roofing, and what use is it capable of in pharmacy? Mr. Markoe, of Boston, spoke briefly upon this subject.

Query 15. What is the best substitute for camphor for the protection of woollens from moths and other insects, that will be cheaper and equally effective? Mr. Markoe responded, recommending the use of naphthaline. Dr. Squibb recommended coal tar creasote.

A paper was read upon Query 20. *Lycopodium clavatum* is said to grow in this country: to what extent is this true, and may the lycopodium sporules be collected from it for the supply of commerce? The writer was of the opinion that the drug could not profitably be grown in this country.

Professor John M. Maisch, of Philadelphia, spoke briefly in

regard to Query 30. Can a pharmaceutical preparation be made from the *Lactuca elongata*, which may be used as a substitute for lactucarium and its preparations? The essay intimated that the thing was probable.

Mr. A. B. Taylor, of Philadelphia, read a volunteer paper on the preparation of fluid extracts.

New Drug Law.

On the following morning (Thursday), the members assembled at eight o'clock, and were photographed, instantaneously we should presume, forming our impressions from the enormous speed and earnestness which seems to have characterised their proceedings throughout. An interesting discussion occupied this morning's sitting relative to the form of a new drug law, regulating the sale of drugs, for the United States. The bill proposed seems to have been very similar to our own Pharmacy Act, but at the meeting there was but little agreement among the members respecting its provisions, and the result was, as well as we can gather, that the suggested law was somewhat pompously buried under six resolutions, which expressed the opinion of the association that qualifications for pharmacists were highly important, but that the difficulties of legislation were such that "we must be satisfied with enunciating the broad principles which in our judgment should direct" it. If our transatlantic fellow-tradesmen should decide to have a bill of this kind, we would strongly advise them, from our own experience, *not* to be satisfied with enunciating broad principles, but to superintend the whole of the details of the bill as well, unless they have very much more confidence in the practical sense and foresight of their senators than we have reason to place in ours. Thursday afternoon was again chiefly occupied with some interesting pharmaceutical papers.

Professor G. F. H. Markoe, of Boston, read a paper in answer to the query "Are the extract and fluid extract of conium of commerce as inert as some recent writers represent, and can these preparations, made by the process of Pharmacopœia, be depended on?" The first portion of the query he denied, and the latter answered affirmatively. Dr. E. R. Squibb and Professor Maisch differed from Professor Markoe.

Mr. Taylor read a paper on oxalate of iron, by D. S. Dyson, of Bloomington, Illinois, sustaining Dr. Schafer in his claim of having first introduced it into medical use.

Mr. Massot, of St. Louis, read a paper written by Thomas Fay,

upon the work and duties of the chemist and character of the pharmacist.

Mr. Van Sweringer, of Indiana, read a paper on the advancement of pharmaceutical science.

Professor Maisch read a paper, written by J. S. Lemburger, of Pennsylvania, on the following query:—"In view of the scarcity and high price of cardamoms, may not *Asarum Canadense*, *Canella alba*, calamus and ginger, be used singly or combined in place of that aromatic in some officinal preparations at the next revision of the Pharmacopœia?" He answered, and recommended affirmatively.

Professor Maisch read volunteer papers by P. C. Candidus, of Mobile, on the new method of administering quinine, and by J. T. King, of Middleport, N.Y., on the deposits made by the tincture of rhubarb.

J. W. Smith, of Philadelphia, read a paper on sweet Epsom salts.

ARTIFICIAL MINERAL WATERS.—KISSINGEN.

The mode of manufacture is thus described by R. Rother.

The process is now effected by first bringing the entire constituents into simple concentrated solution in two separate parts, designated as Earthy Solution or No. 1, and Alkaline Solution or No. 2. Process No. 1 is accomplished in two sections, A and B; and the course of proceeding takes place as indicated in the following condensed formula.

EARTHY SOLUTION.—(No. 1.)

A.	Chloride of calcium (fused)	1981·62 grains.
	Carbonate of lithia	13·38 ,,
	Water, sufficient.	
B.	Crystallized sulphate of magnesia	1566·79 grains.
	,, *potassa* alum	166·27 ,,
	,, protosulphate of iron	58·12 ,,
	Chloride of ammonium	2·2 ,,
	Water, sufficient.	

ALKALINE SOLUTION.—(No. 2.)

Chloride of sodium	2862·13 grains.
Crystallized sulphate of soda	1599·35 ,,
,, carbonate of soda	2538·29 ,,
Nitrate of soda	7·15 ,,
Crystallized phosphate of soda	9·96 ,,
Solution of silicate of soda, sp. gr. 1·388 (containing 14·46 grains, 2Na O, 3Si O_3)	41·31 ,,
Sulphate of potassa	172·34 ,,
Bromide of potassium	74·47 ,,
Water sufficient.	

Fractions of a grain above ½ may be considered 1, and less than ½ may be rejected.

Dissolve the chloride of calcium in 12 fluid ounces of water, by trituration in a mortar, or in a porcelain dish, with heat; to the solution add the carbonate of lithia, and agitate the mixture; then pour the whole into a wide-mouthed bottle, of the capacity of two pints. Dissolve in another vessel, or in the first one, after washing, the ingredients of B: namely, sulphate of magnesia, potassa alum, protosulphate of iron, and chloride of ammonium, with one pint of water, and add this to solution A at once, and in one quantity. The resulting mixture, when the operation is properly managed, will remain clear a few moments, then, gradually, the sulphate of lime separates as a crystalline powder (not amorphous); after five or ten minutes the whole is thrown on a muslin strainer, and the liquid pressed out with some considerable force; the hard crystalline residue of sulphate of lime, with some carbonate, is then moistened with six or eight fluid ounces of water, and again wrung out. The nearly clear solution thus obtained will measure about two pints, and may be filtered, if desirable, which, however, is altogether superfluous. This constitutes solution No. 1.

The chloride of sodium (pure and perfectly dry), is now dissolved in 1½ pints of water, with frequent agitation. The sulphates of potassa and soda, and the carbonate of soda (dry but not effloresced), are together dissolved in somewhat less than 1½ pints of water, with the aid of heat; to this is added the chloride of sodium solution, and then the remaining salts, first dissolved in a few fluid ounces of water. This furnishes solution No. 2, measuring about three pints, which must be filtered.

Solutions No. 1 and No. 2, when added in succession to 12 gallons of water, in a fountain, and impregnated with carbonic acid, under a desirable pressure, yield artificial Kissingen Water of unsurpassed quality. These results are based upon the writer's own experience, who has, during the past season, frequently manufactured this mineral water by the above process, in quantities of ten fountains at a time.

The writer, therefore, considers his duty done; let subsequent operators now do theirs.

Chicago, August 7th, 1869.

BEETROOT SUGAR.

The *Food Journal* thinks that its readers will feel interest in learning how the beetroot has obtained so much importance, and

how it is being utilised. Referring to the large quantity of sugar required to satisfy the wants of the civilised world, and the serious results that would follow from a failure in the supply, a by no means impossible contingency, details are given with reference to the origin of our present supplies. White beet appears to be the particular kind of beet on which the growing trade is founded, its composition being nearly represented as follows:—Water, 83·4; sugar, 10·5; ligneous fibre, 0·8; albumen, casein, etc., 1·5; fatty matter, 0·1; organic substances, 3·7. The objections which have been urged in reference to the British climate are not held very important, the average yield of sugar from English roots being quite equal to that from foreign roots. The use of beetroot as a source of sugar appears advantageous to the farmer, as he is thereby able to obtain double the price for it than if he were to use it for feeding. In the manufacturing process the usual plan is to wash the roots well, and reduce them to pulp by means of revolving circular saws. The pulp is packed in linen bags, and the juice squeezed out by hydraulic pressure; the remaining cake can be used for feeding purposes or for the manufacture of brandy, vinegar, or paper; albuminous substances, etc., are removed by the addition of lime, the juice being heated to a suitable temperature. The tolerably clear liquid is decanted and purified by charcoal filters, and the filtered fluid it submitted to a current of carbonic acid to remove lime, etc.; the latter being filtered off, the clear liquor is evaporated, and the remaining mixture of crystallized sugar and molasses is submitted to the action of the centrifugal machine. The beetroot sugar thus obtained may be subsequently refined. The molasses does not appear available in any way as human food, on account of its nastiness. Reference is made to M. Rousseau's experiments, which appear to have removed many of the difficulties in reference to expense.

BENZINE, THE SALE OF.

Great excitement was caused by several wholesale druggists being summoned for the sale of benzine as an infringement of the Petroleum Act. On December 8, 1869, Messrs. Newbery & Sons, of St. Paul's Churchyard, Barclay & Sons, of Farringdon Street, and Wm. Edwards, of Old Change, were summoned to the Guildhall Police-court, before Sir Robert Carden, to answer a charge brought against them by the City authorities of an alleged infringement of the Petroleum Act. The City solicitor prosecuted; Mr. Poland appeared for Messrs. Newbery as well as for Messrs. Barclay, and

Mr. Edwards appeared in person. In the course of the trial it transpired that Messrs Newbery had applied for a licence and had been refused. Messrs. Barclay had also applied for a licence, and received a reply indicating certain provisions for storeage which were considered necessary, and these arrangements had been attended to by the firm, but on neither side there had been any further correspondence. Mr. Edwards had not applied for a licence at all. In all other respects the cases were essentially similar, and therefore only that against Messrs. Newbery was gone into. This, it was stated, was the third prosecution in the City under the Act, and it was described by the City solicitor as an aggravated case, on account of the circumstance just referred to. An inspector of weights and measures named Ledger proved that he had obtained from Mr. Newbery certain samples labelled respectively Benzine Collas and Jackson's Benzine, the first of which he found flashed at 75° Fahr., and the second *ignited* at 50° Fahr. In reply to Mr. Poland, this witness said that Mr. Newbery let him have the samples quite readily, and on each was the proper caution label. He knew nothing of the Supplementary Act introduced by the Home Secretary during the last session, but not passed, which was intended to permit the sale of such preparations as these under certain restrictions. Dr. Letheby was examined to prove the nature of these preparations, and to show that they came under the meaning of the Petroleum Act. Mr. Poland, addressing the magistrate, remarked on this question to the whole trade, inasmuch as these were articles of daily sale and use all over the country, and were supplied by chemists, bazaars, etc., where a petroleum licence was unknown. He argued that, assuming the law had been infringed at all, it must certainly be an offence against the 6th, and not the 4th section of the Act, the latter being the one upon which the prosecution asked for a conviction. The 4th section clearly referred to the storeage of petroleum in large quantities, and in framing the 6th section the legislature must have had another and a less dangerous sort of dealing in view, as in the first instance the offender was liable to a penalty of £20 a day for every day the article was kept in stock without a licence, while in the second instance the fine was limited to £5. On receipt of the refusal to grant a licence, Messrs. Newbery had at once discontinued the sale of all kinds of benzine, although they found great inconvenience and some injury to their business resulting from this. But when the Home Secretary last session introduced an Amendment Act to remedy the inconvenience which had thus been inadvertently occasioned by permitting the sale of pre-

parations like these, not used for illuminating purposes, provided they were capsuled over and labelled with a sufficient precautionary notice, Messrs. Newbery, in common with many other firms, not being versed in the law, presumed that that Amendment Act had passed, and therefore resumed the business which they had suspended. Only when this prosecution was instituted had they discovered that the Amendment Act was among the many which, at the end of a session, are always pushed aside. Under these circumstances, he submitted to Sir Robert Carden, that if he thought it desirable to convict at all, the offence was so slight, and his clients had shown such perfect good faith and desire to act strictly in accordance with the law throughout, that a nominal penalty would fully answer the ends of justice. Sir R. Carden said that, taking into consideration these facts, and knowing that there had been no intention to break the law, he should inflict the nominal fine of 40*s.*, each party to pay their own costs. A similar judgment was given in each of the other cases.

DENTISTRY.

Cements and Polishes. Dr. E. Wildman. (*America.*)

Cements for retaining teeth to plate in fitting them down, or to try in the mouth before placing in the investment:—

1.	Gum mastich	8 parts.
	Yellow wax	4 „
	Colour, q. s.	
2.	Gum dammar	7 parts.
	Yellow wax	4 „
	Colour, q. s.	
3.	Rosin	2 parts.
	Wax	1 „

Nos. 1 and 2 possess very similar properties, being sufficiently adhesive and strong to answer the desired end, and are preferable to No. 3, on account of being firmer and more readily cleaned off the work, prior to applying borax. Gum dammar being so much less expensive than mastich, I use No. 2.

To make these cements, place the vessel containing the wax and gum over a moderate heat, just sufficient to melt them, and stir until thoroughly incorporated; then add the colour in quantity to produce the desired shade. Venetian red, drop lake, or vermilion, may be used. When all of the ingredients are well mixed, pour into a basin of cold water. To form into sticks, immerse the cake

in water sufficiently warm to render it plastic. It is preferable to colour it, as it renders it more sightly, and, also, we are better able to detect minute particles adhering to parts where solder is desired to flow and remove them. If desirable, it may be perfumed by adding an odoriferous oil just before pouring into cold water.

The following makes an adhesive cement of a dark colour, which may be made more agreeable to the eye by the addition of Venetian red or vermilion. It answers a good purpose to attach specimens to pedestals, etc.:—

4. Rosin	4 parts.
Gutta-percha	1 „

First melt the rosin, then add the gutta-percha, cut into shreds, and stir until they are united.

No. 5 is a good waterproof cement, but does not possess much strength; it will resist the action of water much better than shellac. An iron vessel coated with this composition will be protected from oxidization. In proof I tested it on an iron frame aquarium, which, after a constant exposure to water for four years, remained intact.

5. Pitch	4 ozs.
White wax	2½ ozs.
Gutta-percha	3½ ozs.

First melt the pitch and wax together; then add the gutta-percha, cut into shreds, a little at a time, and stir until they are thoroughly incorporated.

To make a cement for building up pebble-work, etc., for an aquarium, add to the above, after the ingredients are united, white clay, perfectly dry and finely pulverised, in quantity about one-fourth the weight of the mass. In using the pebbles or articles to be joined, they should be warm, and the cement, in a fluid state, applied with a brush to the surfaces to be united.

Cap Cement (6), so called by the late Professor Faraday. It makes a good strong cement to attach wood to glass. The parts to be united should be made quite hot, the cement applied in a fluid state, then firmly pressed together, and retained until cool.

6. Rosin	5 parts.
Yellow wax	1 „
Venetian red	1 „

The Venetian red should be thoroughly dried, and in a very fine powder, introduced a little at a time, and stirred into the melted mass.

Shellac Cement.—Gum shellac makes an excellent strong cement for joining small surfaces of wood together, and in many cases is far more convenient than glue. The shellac should be flowed upon the surfaces to be joined, and then they should immediately be pressed firmly together while the shellac is in a fluid state; in a minute or two the pieces will be found firmly united.

A convenient way of preparing gum shellac for laboratory use is to fuse the gum, as found in the shops, in a suitable vessel over a slow fire, being careful not to raise the heat higher than just sufficient to melt the gum, and, when fused, cast it in a mould; when cooled sufficiently to be plastic, but not adhesive, it may be worked into sticks. In manipulating this or No. 2, the hands should be kept moist with water.

Alum Cement.—This is principally useful to the dentist in securing an instrument to a pearl handle; it is strong and durable when not exposed to moisture, and at the same time colourless.

Take the common alum crystals, place in a spoon over a quick fire; the alum melts in its water of crystallization so as to become perfectly fluid; while in this state, apply to the parts to be united, and press together.

To produce a good result, the whole operation must be performed expeditiously; care to be observed not to allow the water of crystallization to be driven of, or the fluid to cool before the parts are joined.

To Polish Ivory.—Remove any scratches or file marks that may be present with finely pulverised pumice-stone moistened with water. Then wash the ivory, and polish with prepared chalk, applied moist upon a piece of chamois leather, rubbing quickly.

To Polish Pearl.—Take very finely pulverised rotten-stone, and make into a thick paste by adding olive oil; then add sulphuric acid (oil of vitriol), a sufficient quantity to make into a thin paste.

This is to be applied on a velvet cork; rub quickly, and as soon as the pearl takes the polish wash it. This mixture, when properly applied, will give to pearl a brilliant polish.

FORMULÆ FOR ELIXIRS.

By E. L. Milhau.

If physicians could be prevailed upon to specify just what they require in prescribing an elixir, they could be as easily served as when they prescribe any potion or pill. It would only be requisite to keep on hand a *simple elixir* to which could be added a solution

of the pyrophosphate of iron, the ammonio citrate of bismuth, the citrate of quinia, or the fluid extracts of various substances, or whatever the prescription would call for.

Manufacturers of elixirs carefully avoid stating the exact salt or compound they use; for instance, they will say merely "five grains of iron, or phosphate of iron," where they should say "five grains of the soluble pyrophosphate of iron," which is quite another thing. They will say the "activity of twenty-five grains of Peruvian bark," instead of "one grain of sulphate of quinia." It was hoped that the American Pharmaceutical Association would have adopted a set of unofficinal formulæ at the last convention, so that pharmacists might have some recognised standard to go by.

In default thereof the following formula for an elixir will probably be found to answer as well as some that are advertised:

℞ Sherry wine, simple syrup . . . . . āā Oiss.
Spirit of wine . . . . . Oi.
Water . . . . . Oiii.
Orange-flower water, tincture of orange peel āā f. ℥iv.
Tincture of coriander seed . . . . . f. ℥ i.
Oil of lemon, oil of cinnamon (or else oil of anise and nutmegs), and oil of melissa, a very few drops of each, just to flavour.

Elixirs containing iron would require, perhaps, less wine (as it darkens the solution), and the elixirs containing pepsin may be flavoured by a further addition of some of the elixir of Garus.

Thus, if a physician would prescribe,

℞ Citrate of quinia . . . . . gr. i.
Pyrophosphate of iron . . . . . gr. x.
Ammonio citrate bismuth . . . . . gr. iv.
Simple elixir . . . . . f. ℥ i.

Mix: a tablespoonful at a dose.

This order could be promptly filled by dissolving the solids in as little menstruum as possible in a small evaporating dish, and adding enough of the elixir to make up the quantity; filtering if necessary, before delivery, and if the prescription is ever likely to be repeated by the physician, enough can be made up to meet the probable demand.—New York City, *October*, 1869.

Elixir of Cinchona with Iron.

A desideratum generally felt by the dispensing pharmacist, is a uniform and practical formula for preparing these numerous so-called *Elixirs of Cinchona*—"Ferro-phosphated Elixir of Calisaya Bark,"

"Elixir of Bark and Iron," "Elixir Calisayæ Ferratum." The manufacturers of these *scientific specialties* claiming unusual skill in presenting this *invaluable* combination of *tonics* to the medical profession and suffering humanity.

The following suggests itself as a practical formula, being without a complex process, easy of execution, yielding a permanent and agreeable preparation, and always uniform in strength and composition:—

℞ Pyrophosphate of iron	gr. 1024
Sulphate of cinchona	gr. 128
Sulphate of quinia	gr. 64
Oil of orange (fresh)	f. ʒi.
Oil of lemon	f. ʒss.
Oil of caraway seed	♏x.
Oil of nutmegs	♏x.
Oil of cloves	♏v.
Oil of cinnamon	♏v.
Alcohol	f. ʒxxiv.
Simple syrup	Oiv.
Water	Oiiss.

Dissolve the sulphate of cinchona and the sulphate of quinia in the alcohol; add the oils, and mix with the simple syrup.

Dissolve the pyrophosphate of iron in the water, and mix the solutions; filter and add sufficient water through the filter to make the elixir measure eight pints.

Caramel may be added to colour if deemed advisable. Each tablespoonful contains four grains of pyrophosphate of iron, one half grain of sulphate of cinchona, and quarter grain sulphate of quinia.

To this elixir of cinchona with iron, ammonio-citrate of bismuth, one grain to each half fluid ounce, when added, forms the *elixir cinchona, iron and bismuth*, and if strychnia, in the proportion of $\frac{1}{10}$ grain to each half fluid ounce is added, it will produce the scientific and "valuable adjunct to the other constituents," under the title *elixir cinchona, iron and strychnia. O! tempora; O! mores.*

ALBERT EBERT.

COMPOUND ELIXIR TARAXACUM—THE BEST VEHICLE FOR QUININE.

BY P. C. CANDIDUS.

I present to the A. P. Association a formula for the above elixir, which I prepared about eight months ago, at the request of Dr.

Jerome Cochran, Professor of Chemistry at the Mobile Medical College. He wanted the virtues of prunus virg., taraxacum, and gentian—the latter in small proportion.

℞ Rad. Taraxaci, ℥ vj., or Ext. Tarax. fluid	f. ℥vj.
Cort. Pruni Virg.	℥ iv.
Rad. Gentianæ	℥i.
Cort. Aurantii	℥ii.
,, Cinnamomi, Sem. Coriandri	āā, ℥i.
Sem. Anisi, Sem. Carui, Sem. Card.	āā, ℥ii.
Rad. Glycyrrh	℥i.
Syrup. Simpl.	Oiiss.
Alcohol and water, in the proportion of 1 ofthe former to 3 of the latter, a sufficient quantity.	

The dry ingredients must be reduced to a suitable degree of fineness for percolation. Mix the alcohol and water, moisten the powder with 6 oz. of the mixture, then pack in a conical percolator, and pour on of the alcoholic mixture until $6\frac{1}{2}$ pints are obtained, then add the syrup, and mix them.

Dr. Cochran prescribed it a great deal, mostly as an adjuvant and vehicle of other medicines. One day, a gentleman came in to take a dose of quinine. I looked about for something for him to take it in, when my eyes fell upon the above elixir. I mixed it for him, and to his surprise, it was tasteless. As he felt doubtful of it being quinine, I mixed up some for myself, and it proved to be completely masked. I sent some to several physicians, who pronounced it a success. Dr. E. P. Gaines, and other leading physicians, have been prescribing it ever since to their own and their patients' satisfaction. The quinine should be mixed with the elixir at the time it is taken, although when mixed for several days it is still tasteless.

The dose of the elixir is from half to one ounce, and it is no doubt better than the popular stomach bitters flooding the country.—*Proc. Amer. Pharm. Assoc.*, 1869.

HERB BITTERS. (*American.*)

The compound called "Herb Bitters," as we find it in the market, consists of a reddish-brown colour tincture, slightly turbid, with a strong spirituous and aromatic odour, that of cubebs predominating It has a warm, pungent, and sweetish taste; it contains a considerable amount of colouring matter, and is entirely devoid of *any bitter taste*, which should be one of the greatest characteristics of a medicine of this kind. It does not become turbid by dilution with

water, showing the absence of resins, or gum resins in any appreciable amount. It fails to exhibit, by repeated tests, the presence of quinine or cinchonia, the two most important alkaloids existing in Peruvian bark. Tannin is noticeable in a very small proportion, also soft resin, gum, starch, cane sugar, colouring matter, and extractive matter.

A quantitative analysis of the solid and fluid constituents of the bitters gave the following result :—

Solid matter, 4-5ths of	1 per cent.
Alcohol	32 ,,
Water, about . . .	67 ,,

By the above approximate analysis we find the bitters contain only thirty-two per cent. of absolute alcohol, while whiskey usually rates from forty-eight to fifty-six per cent., or will average fifty; hence we see it lacks eighteen per cent. of spirit to bring it up to the standard of full proof whiskey, which speaks volumes in favour of the manufacturers of herb bitters, for their liberal use of water in diluting the pure spirits which is said to be used in extracting the virtues of potent herbs, which we have found in the 4-5ths of one per cent. of solid extract. The percentage of alcohol given above is a verification of our statement of the stimulating properties of the bitters, especially when administered in wineglassful doses, according to directions on the label.

METRIC SYSTEM IN TURKEY.

There is a hope for the general adoption of this system if it has found its way into a nation by no means given to change and whose customs are supposed to be immemorial.

The Ministerial Council in September last, presented a report, embodying the following principles, which were at once sanctioned by imperial authority.

The 1st Article provides that the system of weights and measures in the Ottoman empire shall henceforth be founded upon the French standard metre, and that their series shall be formed by the decimal multiplication and division of the fundamental units. The names given to the new weights and measures correspond to the customary weights and measures nearest to them. It would be useless to give an account of the whole of these; one example will be sufficient. The decilitre, which contains about as much as an ordinary Turkish coffee-cup, is called the zarf, or cup, after the old measure of that name.

Article 2 orders that a standard French platinum metre, to be deposited in the treasury of the imperial palace, shall constitute the primary standard of length.

The 3rd Article ordains that the metre shall be the unit of length, and that its multiples and subdivisions shall be decimal.

The 4th Article provides that the unit of surface shall be the contents of a square whose side is 10 metres, constituting the mourabba, or are.

According to the 5th Article, the unit of capacity for liquids, and for corn, seeds, and similar dry substances, is to be a cube, having a decimetre for its side. This unit is to be called the eull-chek, or litre.

Article 6 makes the cubic centimetre of distilled water, weighed in vacuo at the usual temperature and atmospheric pressure, the unit of weight, and gives the multiples and subdivisions, with their names in Turkish.

Article 7 ordains that a standard French kilogramme in platinum shall be deposited in the treasury of the imperial palace.

Article 8 provides for the stamping of the scales, weights, and measures to be used under the new system, in order to ensure their correctness.

Article 9 orders the exclusive use of the metric system in its entirety in all administrative departments of the empire, after the 1st of March, 1871, whether in buying or selling. Houses having contracts with the Ottoman government will do well to note this article.

Article 10 states that the old system of weights and measures is optional until the 1st of March, 1874, except in the case of private contracts entered into before that time, but expiring after that date, in which case both the old and the new weights and measures should be mentioned. Merchants entering into contracts with Turkish houses after 1st March, 1871, will see the importance of attending to this provision. No doubt, according to the opinion of jurists here, if the provisions of this article are not complied with such contracts will be null and void. Of course, after the 1st of March, 1871, the new names and values can be used in such contracts without any allusion to the old system.

Article 11 makes the use of the metric system compulsory on every one after the 1st of March, 1874.

Article 12 announces the immediate publication of official tables for the conversion of the old weights and measures into the new, and *vice-versâ*.

Article 13 provides for the teaching of the new system in all schools and educational establishments.

Article 14 enacts that the present law will not apply to the weights used for specie or gold and silver.

Article 15 simply provides for the promulgation of the above enactments.—C. W. Q.

METRIC STANDARDS (INTERNATIONAL).

Report addressed to the Imperial Academy of Science, at St. Petersburgh, by a commission of members of the Academy specially appointed for the purpose, and consisting of MM. Struve, Wild, and Jacobi (the reporter). It bears date June, 1869.

These eminently scientific men recite the recommendations which had already been made by various men of science and international congresses, as to the expediency of adopting uniform and universal fundamental units of weights and measures. They refer to the fact of the diversity which has arisen in course of time in the units of weight and measure in various countries, although originally the same. As an illustration, they draw attention to the differences of the foot and pound of the several European countries.

They admit, that all civilised nations have tacitly agreed to recognise the French metric system as affording for the future the advantages of a universal system of weights and measures, and to adopt the standards deposited at the Palais des Archives at Paris as the primary units of this system, irrespective of the non-accordance of the Mètre des Archives with its scientific definition as the ten millionth part of the meridian quadrant.

But the metric standards at Paris are French standards, and all other countries who adopt the metric system are now compelled to apply to the French Government for permission to obtain copies. It is true that this permission is never withheld, but under the French regulations such copies are not compared directly with the standards of the Archives, but with duplicates at the Conservatoire Impérial des Arts et Métiers.

The commission consider that this course of proceeding is not satisfactory as regards either the independence of the several States, the importance of the subject, or the scientific mode of construction and verification of the primary metric standards furnished for each country; that it also affords no guarantee for the scientific uniformity required in the fundamental units of an international system, even at the time when the standards are first obtained, and still less

against diversities which may arise in course of time, which may extend to commercial weights and measures, such as those found by experience to have arisen in the weights and measures of different nations.

They accordingly propose that an international commission should be nominated by the several governments, to be composed of delegates from all civilised countries. To this commission should be intrusted the construction and verification of primary international standards of measures of length, weight, and capacity, as the base upon which an universal system may be definitely established. They should also superintend the construction and verification of copies of these primary standards for the several countries.

PHARMACY IN VICTORIA.

(*Letter dated Melbourne, August* 14, 1869.)

[There seems a decided contrast between pharmacy in America and in our colonies, yet it seems evident that in both places considerable capital as well as energy is requisite for success. We have always imagined that there is a mental error in calculating profits obtained out of England. Rents being so high, indeed as we have learnt enormous, and general living being on a proportionate scale of expense, heavy discount must be allowed in estimating gain. In India, for instance, salaries only represent relative sums.]

I think a very erroneous impression prevails in the "old country" as to the population, as well as the style of business here, so perhaps a few statistics will not be out of place. The population of the colony at the end of 1867 was about 700,000, the number of chemists in business being about 260. Melbourne itself has a population of 51,000, the suburbs, *i.e.*, within ten miles, 130,000, thus making a total of 181,000; amongst whom are distributed 90 retail druggists seven wholesale ditto, three analytical, and two homœopathic. We are also favoured with 145 medical practitioners, one Chinese, one hydropathic, and two homœopathic ditto. Thus you will see the average population is 2000 to each chemist, which would be looked on, I suppose, as pretty good, were there not another side of the picture, the worst evil in which is the benefit club system, which is carried to such an excess that a thorough good dispensing business is quite a rarity. The reasons why the majority of our population are Odd Fellows, Foresters, Druids, etc., are, firstly, the high fees charged by the medical men in times gone by, thus making it imperative for men of moderate means to join some club in order

to obtain medical assistance at a reasonable rate; and secondly, many of those who joined some years ago being now in better circumstances, still continue to belong to their club, and thus induce others, who could also very well afford to pay for advice, etc., to become members too. Thus it happens that in every township, large or small, nearly three-quarters of the population are club patients, and therefore of very little profit, in a dispensing point of view, to the chemist and druggist. The second evil is the cutting up of our trade by storekeepers (in the old country yclept "grocers"), drapers, and others. This is caused by the youth of the colony, as, in its infancy, when no chemists were here, the storekeeper was the person who sold physic as well as tea, sugar, pick and shovel, and moleskin trousers; and now, although there are chemists shops in almost every street, the public would sooner get their pills at the same shop as their candles and butter, because it saves going to another shop, and they are afraid of being charged a few pence more. The latter, I think, is the most powerful argument in favour of the storekeeper, as no sane chemist would think of competing with him in selling Holloway's Pills and Steedman's Powders at 11*d.*, when 13½*d.* is *your* price, to which freight, duty, and other charges have to be added. As further samples of cutting prices, I may quote Seidlitz powders at 8*d.* per box, castor oil 8*d.* per 6-oz. bottle, Epsom salts from 1 oz. packets for 1*d.*, etc., etc. Of course, as I said before, we do not attempt to compete with these prices, patent medicines (small) being charged 1*s.* 6*d.*, Seidlitz powders 1*s.* 6*d.* and 2*s.*, and dispensing prices are very similar to those in the West-End of London, *viz.*, 8 oz. and 6 oz. mixtures 3*s.* and 2*s.* 6*d.*, draughts 1*s.*, pills 1*s.* and 1*s.* 6*d.* per dozen. The same rule may be observed in the counter trade, for, as far as I have seen, West-End prices may be taken as a fair sample. Rents are very high: a small shop with one room behind (all the upper part of the house being let to different tenants), in the chief streets in Melbourne, being worth £3 to £5 per week, according to position. In the suburbs, of course rents are lower; in a good street, a shop and four-roomed house may be had for £1 10*s.* to £2 per week. Salaries for assistants are much lower than a few years ago; they vary from £1 to £2 10*s.* per week, with board and lodging; but in consequence of the large number of assistants generally out of situations, it is only the larger establishments that pay the high salaries, by which they secure old colonists, who are much preferred to "new chums." On the whole, if any chemist should be hesitating whether to come here or not, I should advise him to stay in "Old England," unless he has capital,

in which case, I don't think he could select a better country to settle in than Victoria.

PHOTOGRAPHY.

Improvements During the Past Year.

In printing processes the most marked improvements and the most novel developments have been made, especially in the direction of permanent and rapid printing. The carbon process, which had, during the few previous years, attained a high state of perfection and practicability in the hands of Mr. Swan, has during the year been still further simplified by Mr. J. R. Johnson, and in simplicity, rapidity, and excellence, it now far surpasses silver printing. Mr. Blair has, during the year, contributed many useful and ingenious suggestions, extending the range of printing facilities with carbon and pigments. Mr. Window has patented a new method of producing carbon pictures in pigment without any transfer, but the details have not yet transpired.

In photo-mechanical printing, the introduction of Herr Albert's process has been the event of the year. Photocollography, or the method of using a film of bichromated gelatine hardened by the action of light passing through a negative, so as to acquire properties resembling those of a lithograph, has been carried by Herr Albert to a degree of perfection never before obtained. The image, although in some slight degree resembling those obtained by lithography, surpasses in perfect delicacy and true half-tone anything hitherto obtained in photo-lithography; and as the prints can be produced with margin, with moderate rapidity and reasonable cost, the process promises a revolution in the application of photography to book illustration. Other processes, based on similar principles, have been introduced during the year, but none equal in practical excellence to that of Herr Albert. The account of it first appeared in the *Photographic News*, where an example was subsequently given. The photo-relief process of Mr. Woodbury has progressed during the year in technical excellence. Whilst the process to which we have referred most resembles fine lithography or photography on plain paper, the latter competes directly with photography on albumenized paper, from which it is not easily distinguishable. It also competes with every method of producing transparent photographs on glass, producing more perfect results than the best at a greatly reduced cost.

Ceramic photography has attracted some attention and made

some progress during the year. The most perfect results, however, produced in this country—those of Mr. Henderson—are, we regret, by a secret process.

Modes of enlarging have not varied much during the year. Enlarging in the camera on wet collodion, and transferring, have become more general. Solomon's magnesium lamp has come into more frequent use; and Dr. Van Monckhoven's new apparatus with the oxyhydrogen light and carbonate of magnesia pillars promises to effect a revolution in modes of enlargement.

In silver printing processes some interesting novelties have appeared during the year. The elegant method of Mr. Sarony of producing what are termed photo-crayons have attracted considerable attention. An enlarged transparent positive on glass, backed by a piece of tinted crayon paper with a hatched vignette design, is found to give a portrait of great softness, and having much of the effect and finish of a well-executed crayon drawing. The method of camera printing on collodion, and then transferring to paper, especially for enlargements, has received more attention, and excellent results are so produced. Printing on tinted papers, or tinting the prints after they are fixed, has been revived to some slight extent during the year. The high lights are either put in with body colour, or stopped out by some resist, whilst the print undergoes its tinting or dyeing process. The effect resembles that of a drawing in black-and-white crayons on a tinted board.

The system of painting through a medium, so as to reduce sharpness, and soften harsh lines and crude gradations, has received some attention during the year, but it has not been generally adopted. The system of modifying defects and softening gradations by retouching the negative has, however, come largely into practice.

Facilities for silver printing, in the shape of permanent sensitive papers, have come considerably into use during the year. Besides the permanent collodio-chloride paper of Obernetta, an excellent example of a similar paper has been introduced by MM. Sanders and Risse, who have also introduced a permanent or keeping sensitive albumenized paper. Mr. Charles Durand and Mr. Henderson have introduced sensitive albumenized papers with long-keeping properties, giving excellent results. MM. Schaeffner and Mahr's carbonate of silver paper possesses somewhat similar qualities, but it requires fuming with ammonia to render it sensitive.

In the production of negatives, no especial modifications have been made. The question as to the possibility of working with alkaline or neutral instead of acid conditions, in the wet collodion

process, has received renewed attention, and some suggestions for rendering work with alkaline conditions possible have been made by Mr. Blanchard and others; but in practice the wet process remains unchanged.

But little has been done in dry processes during the year. The gumgallic process of Mr. Gordon has been more generally practised, and appears to be a general favourite. The coffee process has also been adopted by many with success. No novelty of importance has come into practice.

Developing processes remain unchanged in practice. Alkaline development has become more common in dry processes, and the use of iron solutions in developing dry plates has been extended. A method of dispensing with acid restrainers has been proposed by Mr. Wharton Simpson, who suggests the use of neutral viscous substances to retard reduction, by mechanically impeding the operation of the reducing agent, and delaying precipitation. The method promises some degree of success.—*Year Book of Photography*, 1870. Edited by Mr. G. Wharton Simpson.

How to make Ripe Collodion at once.

The following article, contributed by Mr. Alfred Hughes to the *Year Book of Photography*, cannot fail to interest many of our readers:—

It is very generally known, I believe, that if ether be left in contact with the atmosphere through the bottle stopper flying out, or from other causes, the ether becomes practically unfit for photographic use. The collodion made from it, becoming intensely red, gives thin, hard, wiry images, all roundness, richness, and bloom being lost.

Some little time ago I had some ether (a Winchester quart full), the bottle stopper of which had been out from Saturday till Monday.

At that time I was experimenting with iodides and bromides, and accidentally found out the following way of using up acidified ether.

With the ether above described I made collodion, and, taking twenty ounces, iodised it as follows:—

Iodide ammonium	4 grains	per ounce.
Bromide ammonium	1½ „	

The collodion immediately turned a deep brown, and remained so, giving hard images, and having the appearance of a very old sample.

Twenty ounces more plain collodion were taken, and iodised as follows:—

Iodide cadmium	4 grains.
Bromide cadmium	2 „

This collodion remained quite colourless. Knowing that if this had been made with pure ether, about ten or twelve months' rest would have been needed for it to ripen, and thinking that the acid in the exposed ether might have the effect of time, I allowed the collodion two days' rest, and tried it. It fogged slightly. It was put aside again. In ten days it was clean, gave beautiful negatives (better than those produced by a similarly iodised collodion made o pure ether), and kept for nine months.

Wishing to test this result a little more, I made another collodion iodised as follows :—

Iodide of ammonium	4 grains.
Bromide of cadmium	2 „

I mixed the bases as above, so as to get by the ammonium a collodion to work on the instant, and by the cadmium one that would also keep.

The collodion was tried at once. It worked exceedingly well, but in about a week it became hard, slow, and as useless as that which was made with ammonium alone.

So I concluded that to use acidified ether, cadmium salts alone must be used; and that for ammonium salts, the greatest care must be taken to have the ether as pure as possible.

I have written the above simply as a note of experience, there being, I think, only one practical result; that is, a hint how to rapidly make a ripe cadmium collodion.

Removing Stains from the Hands.

M. Fortin, referring to the use of cyanide of potassium, and of iodide of potassium, and iodine for this purpose, the author says the first endangers health, and even imperils life; the second is very expensive. The author recommends, instead, to wash the hands with a concentrated solution of either sulphate or chloride of zinc, to which some acid is added at the same time. The deepest and blackest stains should be touched with metallic zinc, whereby the reduction of the oxide of silver or that of the gallate of iron is promoted, and all metallic stains adhering to or penetrating into the skin removed. Since most of the salts of zinc are colourless, and soluble in water, the hands become soon quite clean. They should then be washed, first with pure water, and next with soap and water.

POISONING BY PHOSPHORUS.—OIL OF TURPENTINE THE ANTIDOTE.

By Thos. E. Jenkins, M.D., of Louisville, Kentucky.*

Poisoning by phosphorus has become as frequent of late days, as it was by means of arsenic in former times; indeed, the former has taken the place of the latter as the popular toxic agent at present. M. A. Tardieu informs us that in criminal statistics, phosphorus takes the first rank as the fashionable poison. This substitution of phosphorus for arsenic is doubtless brought about by the widespread use of chemical matches, and of phosphate paste for the destruction of rats, mice, and other noxious vermin, and it is the more dangerous since up to this time no real antidote for this poison has been known.

In view of this state of things, M. Personne has made a number of experiments upon dogs, to discover, if possible, some agent with which to combat the deadly effect of this substance. Among other substances, he tried the oil of turpentine, and the sequel will show the success which has followed his trials. He made three series of experiments, using five healthy dogs in each.

The poison and the oil were introduced by means of a stomach tube, and the dose of the former was from 1 to 3 decigrammes ($1\frac{1}{2}$ to $4\frac{1}{2}$ grains) to each animal, given in the state of match-ends in some cases, and in the others the phosphorus was administered in solution in oil of sweet almonds emulsified by means of the yolk of egg. The poison was thus put into a condition most favourable for absorption, and for producing its toxic effect.

The oil of turpentine was employed in the dose of 10 grammes (154 grains) emulsified in like manner, and the experiments continued from the 13th of January to the 27th of February last.

The following results were obtained:—The dogs submitted to the action of phosphorus alone all died; those to which the poison was given and its injection followed in from one to two hours by the antidote, showed the same symptoms as those above mentioned, and some were very sick; one only succumbed; the four survivors recovered perfect health, and were kept from ten to fifteen days, to watch if anything untoward would supervene. In series No. 3, the animals were given the poison, and immediately afterwards the antidote; one of these died; the four others suffered a slight indis-

* *Medical and Surgical Reporter* (Philadelphia).

position only, and were kept up for ten days to a month, without presenting any alteration in their usual health.

All to which no antidote was given died; and eight of the ten to which the turpentine was administered suffered no serious inconvenience.

The deaths which took place in the second and third series occurred on the 22nd of January, when the temperature fell below freezing point, and the water to which the animals had access was congealed. This circumstance should not be lost sight of in attempting to account for the death of the two dogs which had taken the antidote. These dogs also were the ones subjected to the maximum dose of the poison with no increase in the dose of the antidote.

In explaining the action of the antidote in combating the toxic effects of the poison, the subject presents two points of the greatest interest. The first is the *modus operandi* of the poison and of the antidote; the second, the philosophical reasoning which doubtless led to the employment of the antidote.

Apart from the powerfully irritating action on the mucous lining of the stomach of the acid produced by the oxidation of the phosphorus while still lying unabsorbed in the cavity of that organ, this poison possesses an inherent deadly effect upon the blood itself, when taken into the circulation. Absorbed phosphorus kills by preventing proper hæmatosis; it engages the oxygen, and does not allow it to perform its usual functions of aërating the blood, of converting chyle and venous blood into the vitalized fluid. When this takes place rapidly, there is prompt death by asphyxia; when it occurs slowly, it gives rise to fatty degeneration, the result of faulty hæmatosis. The deposition and accumulation of fat in individuals using phosphorus in minute doses as a medicine, was some time ago announced as a fact. Then the question whether the increased fatty deposits be a normal process or a pathological one, would be pertinent. If it be a fatty degeneration in the sense it is generally understood, may we not ascribe the apparent improvement frequently observed in emaciated patients after a course of the hypophosphites (easily oxidizable compounds), rather to the change of one pathological condition for another, or the superinduction of a new pathological state?

Now it has been long known that phosphorus, under ordinary circumstances, is slowly oxidized in the air, giving rise to a sensible increase of temperature, with perceptible evolution of light, especially when the action is observed in the dark. The phosphorus is also found to be covered with a film of acid, resulting from its oxidation.

When, however, the atmosphere surrounding the phosphorus contains a minute proportion, the 1-4444 or more of its volume of the vapour of oil of turpentine, this slow oxidation is suspended until the surrounding temperature or the temperature of the phosphorus is by some means increased; then the amount of the vapour of turpentine must be greatly augmented to produce the same effect. The observations were made between 66° Fahr. and 200° Fahr., by Graham, of London, prior to 1850.

Oil of turpentine or its vapour would then serve to prevent the absorption of oxygen by the phosphorus in the blood, in a similar manner to that during the slow combustion at moderate temperatures in air, and thus the poison is stript of its property of depriving the blood of its essential oxygen, and time is allowed for its elimination without causing serious disorder in the system.

It is here suggested that other bodies than the oil of turpentine may be employed as antidotes for phosphorus upon the same principle, for we know that at the ordinary temperature of 60° Fahr. and even at 150° Fahr., 1-150 of the vapour of ether, 1-450 of olefiant gas, and 1-1820 of the vapour of petroleum will produce the same effect as does the 1-4444 of the vapour of the oil of turpentine upon phosphorus in the atmosphere.

ADDITIONS TO THE LIST OF POISONS.

The following notice was printed in the *London Gazette* of December 21, 1869:—

The Pharmacy Act, 1868.—*Poisons.*

Whereas by section 2 of the "Pharmacy Act, 1868," it is enacted that the Council of the Pharmaceutical Society of Great Britain may from time to time, by resolution, declare that an article in such resolution named ought to be deemed a poison within the meaning of that Act, and thereupon the said Society shall submit the same for the approval of the Privy Council; and that, if such approval shall be given, then such resolution and approval shall be advertised in the *London Gazette*; and that on the expiration of one month from such advertisement, the article named in such resolution shall be deemed to be a poison within the meaning of the said Act:

Notice is hereby given that the Council of the Pharmaceutical Society of Great Britain did, on the 1st day of December, 1869, resolve and declare, in the words following:—

By virtue and in exercise of the powers vested in the Council of the Pharmaceutical Society of Great Britain, the said Council do

hereby resolve and declare that each of the following articles; viz.:—

Preparations of prussic acid,
Preparations of cyanide of potassium and of all metallic cyanides,
Preparations of strychnine,
Preparations of atropine,
Preparations of corrosive sublimate,
Preparations of morphine,
Red oxide of mercury (commonly known as red precipitate of mercury),
Ammoniated mercury (commonly known as white precipitate of mercury),
Every compound containing any poison within the meaning of the "Pharmacy Act, 1868," when prepared or sold for the destruction of vermin,
The tincture and all vesicating liquid preparations of cantharides,—

ought to be deemed a poison within the meaning of the "Pharmacy Act, 1868;" and also that of the same each of the following articles; viz.:—

Preparations of prussic acid,
Preparations of cyanide of potassium and of all metallic cyanides,
Preparations of strychnine,
Preparations of atropine,

—ought to be deemed a poison in the first part of the schedule A to the said "Pharmacy Act, 1868."

And notice is hereby given, that the said Society have submitted the said resolution for the approval of the Lords of Her Majesty's Council, and that such approval has been given.

By order,

ELIAS BREMRIDGE,

Secretary and Registrar of the Pharmaceutical Society of Great Britain.

QUININE, LIGHT SULPHATE OF.—A FRAUD.

BY LOUIS STREHL, Chicago.

A small lot of quinine was recently purchased in this city, bearing the following label: "Light Sulphate of Quinine; manufactured by Lord Bros., Ludgate Hill, London." The manufacturer being un-

known, the "quinine" was submitted to the ordinary tests for its purity.

A casual glance at the article excited no suspicion, but upon a closer scrutiny, the crystals were found to be colourless rhombic prisms, about a line in length, distinct and not interlaced to such an extent as we see them in sulphate of quinia. The taste was bitter, resembling that of the latter alkaloid. The crystalline shape could be readily distinguished by the naked eye.

The crystals were entirely soluble in cold water, and this solution, when treated with chlorine water and ammonia, gave no characteristic indication of quinia. Chlorine water added to a solution of the salt, followed by ferrocyanide of potassium and afterwards by a few drops of water of ammonia, gave no indication of quinia.

The above results show the entire absence of quinia in the so-called "light sulphate of quinine."

An aqueous solution of the salt was precipitated by ammonia; and a portion of the filtrate, treated with chloride of barium, gave no precipitate, showing the absence of sulphuric acid. Another portion of the filtrate was acidulated with nitric acid, and treated with nitrate of silver, which produced a copious white precipitate, soluble in excess of ammonia, showing the presence of hydrochloric acid.

It having been demonstrated that the article contained no quinia, further examination was decided on, having in view the identification of the alkaloid. It is freely soluble in cold and much more so in hot water; soluble in alchohol; cold concentrated sulphuric acid dissolves it without change of colour, but an odour of hydrochloric acid is developed; on the application of heat the solution becomes light brown; the crystals are freely soluble, without change of colour, in concentrated hydrochloric and nitric acids. Soluble in chlorine water without change of colour, and upon the addition of ammonia a dirty white precipitate is produced; and soluble in excess of ammonia. The liquid filtered from the precipitate was of a straw colour.

A solution of the salt, to which a few drops of dilute hydrochloric acid were added, when treated with ferrocyanide of potassium, yielded a copious yellow precipitate. Upon the application of a gentle heat the precipitate dissolved, and the solution upon cooling deposited an abundance of beautiful golden yellow crystals.

These tests, while showing the absence of quinia, furnish conclusive evidence that the alkaloid is cinchonia, containing traces of cinchonidine.

ULTIMATE ANALYSIS OF PLANTS.

GEORGE BROWNEN.

The ashes of vegetables may now be considered. Silica exists in different proportions in most vegetables, being most abundant in the *Graminaceæ* and *Equisetaceæ*. Curious and beautiful skeletons of these plants, composed of silica, may be readily obtained. Silica is distinguished by its insolubility in acids, except hydrofluoric, and by its solubility in alkalies. Phosphates may be dissolved and tested with molybdate of ammonium in nitric acid. The precipitated phospho-molybdic compound may be dissolved, purified, and used as a reagent for alkaloids. Sulphates, chlorides, and other salts, may be dissolved and identified by their distinctive tests. The mineral substances of the ash, however, comprise nearly the whole group of the inorganic elements, and are very important in building up the skeleton of plants. Lime, magnesia, and iron, with potash or soda, exist in most plants, the acids generally in combination being sulphuric, phosphoric, or silicic. Succulent plants generally contain large quantities of alkali (in inland plants it is potash, in plants growing near the sea it is soda) but these bases may be artificially changed in either case, or differ in the same species according to its locality. In the cereals we find a large proportion of earthy salts; and here I may notice those remarkable formations called raphides, found in the the *Liliaceæ*, *Cactaceæ*, and *Polygonaceæ*. Of the metals proper, iron, and sometimes manganese, are the chief bases. Dr. Cameron (*Chemical News*, 1862) found lead in plants growing near some lead smelting works in Ireland. Arsenic was found in plants, according to Davy and Horsley, to support their views; on the contrary other experimenters killed the plants they watered with solutions of arsenic. Spectral analysis has added to this list of ash compounds, lithium and rubidium. Thallium, discovered by Crookes, in soot, may have been a constituent of primeval vegetation. Vines and violets have been said to contain gold in minute quantity, and copper is said to be an invariable constituent of tobacco.

We believe that we cannot better bring our labours to a close than by giving a few translated extracts from the thesis already noticed:—

LACOTE'S ORGANIC BASES.

PREPARATION OF NATURAL ALKALOIDS.—These bases exist nearly always in the vegetable economy, as salts. They are for the most

part insoluble in water, and many even are volatile. When, for instance, they exist in the vegetable condition, free, they are extracted by means of appropriate solvents. So narcotine, which exists in the free state in opium, is extracted by ether or else by essence of turpentine. When (and this is the most usual case) these bases are salts, as morphia, present in opium as meconate of morphia; quinine and cinchonine in the cinchonas, as quinates; strychnine as igasurate; nicotine combined with malic acid,—one of two things happens, namely, that the base is (1) either fixed, or (2) volatile.

1. **Base fixed.** Then since organic acids are feeble, and alkalies sparingly soluble in water, the mode of preparation is not difficult. Boil the substance sufficiently comminuted in water, acidulated by hydrochloric and sulphuric acids: the filtered solution is treated with an alkaline carbonate (carbonic acid is set free) which precipitates the organic base, and this is purified by successive crystallizations in appropriate solvents, such as alcohol, ether, and chloroform.

2. **Base Volatile.** Distil the substance which contains it in presence of lime or potash: the alkaloid thus set at liberty is carried over by the vapour of water, and collected in a cold receiver. Proceeding in this manner, the base is never pure: first it contains ammonia, which is generally separated by agitation in water, supposing the base to be insoluble in this vehicle, or by the air-pump. Other impurities are removed by dissolving it in an appropriate menstruum, as alcohol, ether, and chloroform; and this process is the more general.

If the base, as for instance, nicotine, is soluble in ether, the best plan is to subject the watery extract to alcohol. The alcoholic extract thus obtained is treated by concentrated solution or potash, and shaken up with ether. This ether having been separated by decantation, is treated by oxalic acid, which produces a syrupy mass of oxalate of nicotine which is decomposed by potash. Submitting this mixture to distillation in a current of hydrogen, very pure nicotine is obtained.

Artificial Alkaloids. Several methods of preparation are given including those of M. Fristche, Laurent, Zinin, Fownes, Wurtz, and notably of Hoffmann. The researches of the last savant, show that the number of artificial bases to be obtained from ammonia is infinite, and the general results are—

1. That in a molecule of ammonia, one, two, or three equivalents of hydrogen can be replaced by organic radicals.

2. That under the influence of agents, capable more or less of

replacing hydrogen, two, three, four, and even five molecules of ammonia can be united to molecules of a higher order, in which two, three, twelve, and even fifteen molecules of hydrogen can be replaced by other molecules. The different bases which are derived from one molecule of ammonia, are called *monads;* those derived from two molecules of ammonia, are termed *diads;* those from three, *triads*, and so forth.

Nitrogen is the chief characteristic of organic bases, natural or artificial: these alkaloids can exchange one or more equivalents of hydrogen for alcoholic radicals without alteration of their chemical functions. Natural bases are in general little soluble in water, distinguishing them from the artificial; their special solvents are alcohol, ether, and chloroform. Acid mineral salts are nearly all soluble in water; the contrary being generally the case with respect to vegetable acid salts, for what are more insoluble than the tartrates, oxalates, gallates, and particularly the tannates, of these bases?

In certain salts these alkaloids combine with acids to form a new acid in uniting with a mineral base, as *tartrate of quinine and iron*, where quinine uniting with tartaric acid in the same way as antimony, combines with the iron, and by this combination forms a salt analogous to the antimonials, in which we see the bitter principle of the quinine disappears without its physiological properties having ceased.

Heat, electricity, and electrolysis exercise characteristic action; nor can the chemical history of these bases be understood without reference to the phenomena of oxidation, the action of acids, and of caustic potash.

The well defined distinction between vegetable alkaloids and artificial organic alkalies, as far as hitherto ascertained is, that none yet have succeeded in the synthesis of a natural alkaloid. Still the progress of science forbids us to consider this difference so absolute as formerly. We are bound to admit the possibility of this synthesis which would effectually reveal the true constitution of these bodies.

PHYSIOLOGY OF ORGANIC BASES AND THERAPEUTIC APPLICATIONS.

I. **Papaveraceæ. Alkaloids of Opium.** (*Morphia, Codæia, Narceine, Narcotine, Papaverine, Thebaine.*) The therapeutics of opium have been the subject of a great number of works; among the most recent may be quoted those by Hammond. We will not insist on

well-known facts, briefly mentioning that this agent diminished the secretions, except *perspiration*, which is notably increased.

As to its action on the circulation, and especially on the *nervous system*, it is essentially narcotic. It enfeebles or completely suppresses the three great functions of this system; sensibility, intelligence, and motion. But Mr. Hammond has shown that these facts are not simple, but vary immensely according to the dose.

Three cases must be distinguished—

1. *Weak dose.* Great activity in cerebral circulation, excitement, agitation.

2. *Medium dose.* Cerebral anemia; sleep more or less profound.

3. *Maximum dose.* The brain in the animal becomes blackish, turgid, charged with venous blood: complete coma and stupor.

But, strange to say, if the trachea be opened, and artificial breathing maintained, the brain collapses, becomes pale, and the animal, from a state of coma, falls into a simple sleep.

"From these extremely interesting experiments," says Mr. Regnard, "we infer that a small dose of opium increases intelligence, by exciting the circulation of the brain; a moderate dose, by diminishing the flow of blood, produces sleep; a strong dose produces coma, by impeding respiration; hence the circulation in the brain of blood poisoned by carbonic acid." These facts coincide with the recent experiments of Messrs. Durham and Hammond, confirmed in France by M. Regnard. Opium, moreover, produces a feeble contraction of the pupil.

As to the action of the opium alkaloids examined separately, three of them possess special soporific properties; the three others are directly poisonous and convulsive.

The soporific or narcotic alkaloids, are according to the valuable researches of M. C. Bernard, morphia, narceine, and codœia.

Morphia produces a deep sleep, from which the animal awakens stupified and half paralysed. In man, cephalagia often remains. Sensibility is notably dulled; but there is no real anæsthesia, only numbness.

Codœia produces a much lighter sleep. Sensibility is consequently preserved almost intact; a slight pinch will arouse the animal, and on awakening, it is neither stupified nor paralysed, as after sleep caused by morphia. Narceine, according to M. Bernard, is the most somniferous substance of opium. It produces deeper sleep than morphia, with no more distress on awakening than codœia,

thus partaking of the characters of both substances. These facts have been confirmed by Messrs. Debout and Béhier. Altogether we see that the effects produced by opium, and by these three alkaloids separately, are nearly alike.

With respect to the three others, thebaine, papaverine, and narcotine, the differences are more distinct. One centigramme of hydrochlorate of thebaine, injected into the veins of a dog, convulses and kills it in five minutes; death is speedily followed by rigidity. Papaverine and narcotine have been little studied, and seem to resemble thebaine in their effects.

As to their therapeutical applications, they are extremely minute. Pain and neuralgia are admirably overcome by opium. It acts by producing sleep; but care must be taken not to give too small doses, or the contrary effect will be obtained. In wakefulness, the delirium of excitement, in fever, delirium tremens, it is frequently exhibited, and with success, for a suitable dose of opium (gr. 0·05 to 0·10) diminishes the action of the brain. Care must be taken in cases of delirium tremens not to give the absurd doses once recommended. The supposed toleration of the medicine, was owing to non-absorption in dangerous cases; if absorption took place, the patient was poisoned.

It has been employed, but without much success, in nervous attacks, particularly in tetanus; also in fevers. Besides assuaging pain, its great use is in cases of diarrhœa. Finally it is used as a sudorific in Dover's powder. Mention will be made further on of its so-called antagonism to belladonna.

In the case of opium poisoning, the stomach should be emptied if possible, and stimulants, such as coffee, be administered, so as to revive the general circulation, especially that of the brain. The experiments of Hammond, quoted above, suggest the operation of tracheotomy, and it is doubtful whether artificial breathing could not be maintained until the worst was over.

II. **Solanaceæ.** (*Atropine, Daturine, Hyoscyamine, and Nicotine*). Atropine is one of the substances whose action has been most studied. On the digestive tube, it has little effect of interest, except that it produces dryness of throat and mouth, and also diarrhœa. In general, and contrary to usual statement, it has a tendency to diminish the secretions, acting in the same way as opium, except perspiration. Belladonna augments urinary secretion. As regards diarrhœa, it seems due to excitement of the muscular intestinal system, increasing its peristaltic contractions. Belladonna acts on the circulation by increasing its action. Bezold has shown that a demi-

milligramme of atropine, exhibited to a rabbit, doubled the number of heart-beats.

Respiration is accelerated by belladonna at least in non-poisonous doses. Is this due to excitement of the pneumogastric nerve, or its starting point, the vital centre? It acts directly on this last, because acceleration takes place even when the pneumogastric nerve is cut. If the dose is increased, respiration is impeded—a phenomenon analogous to that seen in opium. The nervous system seems very differently affected on account of the modifications of cerebral circulation; delirium and hallucination; later on coma and asphyxia.

The iris is specially affected in a remarkable manner by atropine; absorption by the cornea immediately takes place. Atropine paralyses the common ocular motive nerve. Atropine is nothing less than a narcotic. One of its uses specially indicated, according to M. Sée, is in the treatment of asthma. It acts chiefly by quickening slow breathing; by preventing tetanic contractions of the muscles. 0·05 gr. extract of belladonna is a proper dose. It is used in whooping-cough; it is given with no great success in nervous disorders, epilepsy included. It is a good remedy for pain, but is not equal to opium, which should be preferred. Opium and belladonna are said to be antagonistic, but proofs are wanting. Daturine and hyoscyamine seem to possess much the same effects as atropine; daturine dilates the pupil more rapidly, but its action is less permanent.

Nicotine. Infinitesimal doses of this substance, which is extremely poisonous, can produce marked effects, often seen in the case of those not used to smoking. On the digestive tube, general excitement of the muscular system, production of gastric juice, sickness, and diarrhœa.

Once absorbed, nicotine produces effects differing with the dose. There is no doubt, however, that M. Joly, of the Academy of Medicine at Paris, has singularly exaggerated the evils resulting from the use, or the abuse, of tobacco. Circulation is first quickened by excitement of the intra-cardiac ganglions; then this excitement attacks the *nervus vagus*, should the dose be increased; and then the action of the heart slackens. Increase the dose, and acceleration of the heart's action is extraordinary, the pneumogastric nerve being paralysed. Respiration is increased by small doses of nicotine like belladonna; in large doses the respiratory muscles become tetanised, and cease to act worn out (angina pectoris).

Tobacco is particularly useful in asthma, one pipe or two being of service at the commencement.

[Stramonium or the *Datura tatula* is of infinitely more use. People who have never smoked until an attack of asthma which occurs probably in middle life, cannot tolerate the first effects of the fragrant weed. No one at this moment can indicate a cure, or the speediest alleviation for an attack of asthma; change from one street to another, not even in a different locality, will sometimes work the charm; the late celebrated painter, William Etty, found most relief, held up by attendants in the midst of a November fog (to our certain knowledge), and the statistics of asthma are so strange that we might venture on the conclusion that the treatment of the disease is still little known.—*Ed.*]

III. **Leguminosæ.** Igasurine or éserine, principle found in Calabar bean, introduced recently into medicine, yet as well known as some of the preceding substances. Dr. Daniel first called attention to the toxicological properties of this substance in 1846.

H. Frazer, in 1862, published the first important work on the subject, which was afterwards undertaken by A. Robertson, Giraldès, and De Græfe. Igasurine slackens the circulation, and at the same time augments pressure in the vessels, just like digitalis. It acts on the nerves generally, and also on the muscles, not in paralysing like curare their conductive power, but in destroying their special excitability. We shall see the application that may be made to the treatment of tetanus. As regards the nerves of vegetable life, the first and immediate action is *excitement*, and this is produced before the phenomenon of the paralysis of the motor nerves of animal life.

The iris, in contact with éserine is contracted almost to blindness. What is the mechanism of this contraction? If éserine be added to an eye treated with atropine, the iris contracts. Pass a current of electricity through the great sympathetic nerve, and once more dilatation will be produced. It is not then paralysed; it is the common motor ocular nerve, the sphincter, which is tetanised. Contraction of the pupil, according to Græfe and Donders, commences in ten minutes, attains its maximum between thirty and forty, and disappears completely after two or four days.

It will be seen at once what great advantage may be reaped from the employment of igasurine whenever it is necessary to contract the pupil. But a new and important fact is the marvellous action of Calabar bean in tetanus. Many cases of cure have been published by English physicians; and some have been published by M. Sée. Hopes were entertained about curare which have not been realised in consequence of its acting on the conductive

power, and not on the excitability of the nerve itself. Eserine, on the contrary, paralyses nervous excitability, and in consequence prevents the contraction of the muscle. This has already been seen in many very remarkable cases where chemical experience has triumphantly confirmed the teaching of physiology. Tetanus, thanks to éserine, is about to be classed among curable diseases; it is well known how few were the instances of spontaneous relief.

IV. **Indian Poisons.** (*Curarine.*) There is a certain analogy between igasurine and curarine. A. Bernard, Vulpian, Kölliker, and others have made us familiar with the physiology of this substance.

It acts chiefly on the muscles, and paralyses them; its action is as follows: not the centres, nor the nerve branches, but the peripheral extremities of the nerves are attacked. Steep a nerve in curare, and pass a current of electricity through the corresponding muscle; this last contracts. Plunge, on the contrary, this muscle in the poisonous mixture; electricity produces no movement. The nerve is attacked as *conductor*. It has lost, says M. Vulpian, its power of transmission to the muscle. Therefore curare has failed in tetanus; it was thought to destroy excitability: it does nothing of the sort it only diminishes its action and withholds its conductive power. For this reason its action has generally been powerless; and on the contrary, igasurine, which annihilates excitability, should sometimes cure tetanus—which it does.

Curarine is fatal owing to the asphyxia produced, and paralysis of the respiration. The heart is very slowly attacked. It also paralyses the vascular nerves.

V. **Umbelliferæ.** (*Conine.*) Conine or conicine has almost an identical behaviour with curare. It diminishes sensibility to some slight extent, but less affects respiration. According to the investigations of Guttmann, it increases the pulsations of the heart, but not their strength. Stoll formerly vaunted the merits of hemlock; it was given in convulsive affections, and even as cure for cancer. Its present therapeutic applications are of doubtful efficacy.

VI. **Ranunculaceæ.** (*Aconitine.*) The aconitine series have been described already. "Aconitine is truly an anti-pyretic, neither a diuretic nor a diaphoretic. It can be employed to diminish the heart's action in hypertrophy. There is a danger arising from its too energetic action." [We believe that in England it is only ordered for external use.]

VII. **Loganiaceæ.** (*Strychnine, Brucine.*) The action of these alkaloids is well known. Strychnine will be considered first; the

action of brucine being analogous though less energetic. Strychnine is an irritant of the excito-motor of the medulla, administered in a dose supposed suitable. It produces headache and other inconveniences. Poisonous doses produce tetanic contractions, the head thrown back, and convulsive movements [with all which painful symptoms we in England are painfully acquainted, owing to the notorious Palmer trial. The judge expressed the wish that he might never hear the word strychnia again].

No mental disturbance seems to result. In smaller doses, it excites the nerves and muscles. Its use is specially indicated in general or local paralysis. Trousseau considered it an excellent remedy for chorea, but it is not always to be relied upon. In case of poisoning, chloroform has been recommended, inasmuch as it stops the convulsions; this seems preferable to iodide of potassium, praised by some. [The difficulty in these cases, seldom recognised in toxicological manuals, is that poisoners with a grain of sense, never use what are called poisonous doses, they trust to slow action and accumulation in the system. Iodide of potassium itself, supposed to be an admirable remedy in case of gout and rheumatism, has most innocently produced effects which were disastrous.]

VIII. **Rubiaceæ.** (*Quinine, Cinchonine, Cafeine.*) Quinine, generally given as sulphate, produces a slight excitement in the digestive tube. But it is on the circulation and temperature that its effects appear most powerful and distinct. Quinine beyond doubt is an anti-febrile. It produces headache, deafness, and unpleasant cerebral sensations. But it *conquers* pain.

Cafeine. In spite of numerous works on this subject, much has still to be done in order to define the real action of this alkaloid. In a general way its action is favourable. Burnt coffee and cafeine accelerate the heart and excite local circulation, particularly in the brain. Every one knows how useful it is to the midnight student. It is not good for children or for very nervous persons, on account of the palpitations it may occasion.

As to the amount of nutrition contained in coffee, we know nothing definite. We know how useful it is in hot countries for sustaining strength, and restoring energy. It is one of the best remedies to be employed in case of opium poisoning.

IX. **Colchicaceæ.** (*Veratria, Colchicine.*) Veratria is one of the most active alkaloids. On the digestive tube, veratria produces vomiting and diarrhœa. This is, according to M. Sée, a nervo-muscular phenomenon, for when injected into the blood it produces the same effect. We think, nevertheless, that there must be con-

siderable local irritation besides, which ought to be examined. The nervo-muscular system is influenced in two very different ways, first by excitement, next by paralysis. It is the nervous extremity and the muscles which are affected, principally the latter. The heart also is first excited and then is partially paralysed. Bezold considers veratria as a muscular poison, acting also on the motor nerves, which it first excites, and then tends to destroy. It is, as he says, a heart poison. There is also a sensible diminution of arterial pressure. In death by veratria, which generally takes place by asphyxia, the heart is contracted. We want new researches to find out the real action on the heart. One fact is certain, whatever may be its mechanical action, veratria notably lowers temperature. When the pulse is falling 20 or 30 beats, bodily heat is so depressed that the skin becomes cold and clammy, as in cases of cholera or like a cold-blooded animal. Perhaps this coldness is due to the simple fact of the great slowness of respiration.

Veratria is then an antipyretic; thus it may and ought to be exhibited in certain febrile affections. One of its best uses is in cases of acute articular rheumatism. Its action must be carefully watched for fear of too much exciting the circulation. Aran has praised its use in pulmonary febrile affections, in pneumonia. Respiration becoming slower is to be feared, as that may increase dyspnœa.

Colchicine has been less studied than veratria; various experiments however have been made in France and elsewhere. This is what was observed in the experiments made in the laboratory of M. Sée; 0·03 gr. of colchicine were sufficient to kill a dog with vomiting and diarrhœa. The post-mortem examination showed much bloody filtration in the intestine, having nothing to do with the inflammation.

Sensibility seems to be paralysed. As to the vascular system, only a transitory diminution of the beating of the heart and of the arterial pressure was observed, except in case of poisonous doses. Then appear the phenomena of coldness of the surface, lessening of the pulse, and arterial tension. An important fact seems to result from M. Sée's researches, and that is the modification of the excretions. In the dog urea increases at the same time as uric acid, the temperature rising in some cases 2 degrees. This increase of heat cannot be due to a simple accumulation; there has been loss rather from the relaxing of the vessels. There has been real production of heat, which naturally coincides with the increase of urea. An important fact to be noted is that colchicum and colchicine produce analogous

effects, but differing in some points; thus the increase of urea is the same in both cases, but as to the uric acid, the results are opposite.

From these facts we infer that the great use of colchicum and colchicine is in cases of gout, not rheumatism. The well known experience of Garrod allows us to state, that there is always in gouty subjects an excess of uric acid in the blood.

Take some serum from the blood or from a blister; add a tenth part of its weight of acetic-acid, and let it evaporate in a watch-glass, after laying a few threads of lint across it. At the end of 24 to 36 hours, the threads will be seen under the microscope to be covered with uric acid crystals.

Thus colchicum and colchicine are the great remedies for gout. Their action seems essentially the elimination of urea and uric acid. They do not act like drastics; other strong aperients do not produce the same effects; moreover relief is often produced before the purging begins.

The toxicology of the alkaloids is too large a subject on which to enter in this volume, and its consideration would lead us to transgress the space assigned.

PROCEEDINGS

OF THE

British Pharmaceutical Conference

AT THE

SEVENTH ANNUAL MEETING

AT

LIVERPOOL.

1870.

EDITED BY

THE SECRETARIES.

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British Pharmaceutical Conference.

CONSTITUTION.

Art. I.—This Association shall be called The British Pharmaceutical Conference, and its objects shall be the following:—

1. To hold an annual Conference of those engaged in the practice, or interested in the advancement of Pharmacy, with the view of promoting their friendly reunion, and increasing their facilities for the cultivation of Pharmaceutical Science.
2. To determine what questions in Pharmaceutical Science require investigation, and, when practicable, to allot them to individuals or committees to report thereon.
3. To maintain uncompromisingly the principle of Purity in Medicine.
4. To form a bond of union amongst the various associations established for the advancement of Pharmacy, by receiving from them delegates to the annual Conference.

Art. II.—Membership in the Conference shall not be considered as conferring any guarantee of professional competency.

RULES.

1. Any person desiring to become a member of the Conference, shall be nominated in writing by a member, and be balloted for at a general meeting of the members, two-thirds of the votes given being needful for his election. If the application be made during the recess, the Executive Committee may elect the candidate by an unanimous vote.
2. The subscription shall be 5s. annually, which shall be due in advance, upon July 1.
3. Any member whose subscription shall be more than two years in arrear, after written application, shall be liable to be removed from the list by the Executive Committee. Members may be expelled for improper conduct by a majority of three-fourths of those voting at a general meeting, providing that fourteen days' notice of such intention of expulsion has been sent by the Secretaries to each member of the Conference.
4. Every association established for the advancement of Pharmacy shall, during its recognition by the Conference, be entitled to send delegates to the annual meeting.
5. The Officers of the Conference shall be a President, four Vice-presidents, a Treasurer, by election, the past Presidents (who shall be Vice-presidents), two General Secretaries, one Local Secretary, and nine other members, who shall collectively constitute the Executive Committee. Three members of this Executive Committee to retire annually by ballot, the remainder being eligible for re-election. They shall be elected at each annual meeting by ballot of those present.
6. At each Conference, it shall be determined at what place and time to hold that of the next year.
7. Two members shall be elected by the Conference to audit the Treasurer's accounts, such audited accounts to be presented annually.
8. The Executive Committee shall present a report of proceedings annually.
9. These Rules shall not be altered except at an annual meeting of the members.
10. Reports on subjects entrusted to individuals or committees for investigation shall be presented to a future meeting of the Conference, whose property they shall become. All reports shall be presented to the Executive Committee at least fourteen days before the annual meeting.

*** *Authors are specially requested to send the titles of their Papers to either of the General Secretaries two or three weeks before the Annual Meeting. The subjects will then be extensively advertised, and thus full interest be secured.*

FORM OF NOMINATION.

I Nominate

(Name).....

(Address).....

as a Member of the British Pharmaceutical Conference.

.....*Member.*

Date.....

The nomination must be legibly written, and forwarded to the Honorary General Secretaries, Prof. Attfield, 17, Bloomsbury Square, W.C., or Mr. Reynolds, 13, Briggate, Leeds, either of whom, or any other officer or member, will duly sign the paper.

Pupils and Assistants, as well as Principals, are invited to become members.

HONORARY MEMBERS.

Professor P. Wendover Bedford, College of Pharmacy, New York City, U.S.A., Corresponding Secretary of the American Pharmaceutical Association, 278, Greenwich Street, New York.
Senhor Joaquim Correa de Mêllo, Campinas, Brazil.
M. Augustin Ambroise Delondre, Member de la Société Botanique de France, de la Société d'Acclimatation, Chevalier de l'Ordre Impériale de la Rose (Brésil), etc., Rue St. Pierre, 3, Sèvres.
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Dr. John Baker Edwards, Ph.D., F.C.S., Ex-Vice-President of the British Pharmaceutical Conference, Box 398½, Post Office, Montreal, Dominion of Canada.
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Professor William Proctor, jun., College of Pharmacy, Philadelphia, U.S.A.
Dr. J. Leon Soubeiran, Prof. Agrégé Ecole de Pharmacie, Secretaire de la Société d'Acclimatation, Chevalier de l'Ordre Impériale de la Rose (Brésil), Knight of the Royal Order of Charles the Third of Spain, Hotel Lauragais, Rue de Lille, 19, Paris.

—o—

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Woodward, Dr. C. M., Waterloo, North America.

*** *The Secretaries will be glad to receive notice of any inaccuracies in this list.*

Number of Members, October 29th, 1870,—1550.

LIST OF MEMBERS.

For Alphabetical List of Towns, see page 329.

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Allanson, Mr. C., Montpelier Parade, Low Harrowgate.
Allchin, Mr. A., Richmond Road, Barnsbury, N.
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Anderson, Mr. A. B., 38, Princes Street, Dundee.
Anderson, Mr. T. S., 30, Duke Street, Manchester Square, W.
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Barnitt, Mr. J., 30, Upper Parade, Leamington.
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Barraclough, Mr. T., Roscoe Terrace, Chapeltown Road, Leeds.
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Barron, Mr. W., 37, Winchcomb Street, Cheltenham.
Barton, Mr. A. F. G., 32, Edge Lane, Liverpool.
Barton, Mr. F., 32, Edge Lane, Liverpool.
Barton, Mr. H., Kenilworth.
Barton, Mr. H., 77, King's Road, Brighton.
Bartlett, Mr. H., jun., Colyton, Devon.
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Bass, Mr. J., Hatton Garden, E.C.
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Bevans, Mr. J., 3, Premier Place, Mount Radford, Exeter.
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Bicknell, Mr. W., 38, Ebury Street, Pimlico, S.W.
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Blackshaw, Mr. T., 36, Market Place, Burslem.
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Blanchflower, Mr. T. C., South Quay, Yarmouth.
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Bloye, Mr. H., 7, High Street, High Wycombe, Bucks.
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Boast, Mr. J., 45, Kirkgate, Bradford, Yorks.
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Bond, Mr. J., Great Yarmouth.
Boor, Mr. G., Brownswood Park, Hornsey, N.
Booth, Mr. J., Blackburn.
Booth, Mr. J., Elmsfields, Rochdale.
Booth, Mr. J., Heckmondwike.
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Botham, Mr. J. B., 1, Great Clowes Street, Manchester.
Bottle, Mr. A., Townwall Street, Dover.
Boucher, Mr. J., Union Street, Bristol.
Bourdas, Mr. I., 7, Pont Street, S.W.
Bourdas, Mr. I., jun., 48, Belgrave Road, S.W.
Bourne, Mr. C., Union Street, Bristol.
Bowden, Mr. W., 76, Liverpool Road, Patricroft, Lancashire.
Bowen, Mr. W. (address unknown).
Bowman, Mr. H., Washington, near Newcastle-on-Tyne.
Boyce, Mr. G., Chertsey.
Boyce, Mr. J. P., Windsor.
Bracher, Mr. E., Mere, Wiltshire.
Brady, Mr. A., 29, Mosley Street, Newcastle-on-Tyne.
Brady, H. B., F.L.S., F.C.S., 29, Mosley Street, Newcastle-on-Tyne.

Bradley, Mr. T. D., 33, Bond Street, Brighton.
Braithwaite, Mr J. C., 54, Kentish Town Road, N.W.
Bray, Mr. J., 71, High Street, Mile Town, Sheerness.
Bray, Mr. R., 23, Pembroke Street, Devonport.
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Brayshay, Mr. W. B., Stockton-on-Tees.
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Bright, Mr. R., 29, Broad Bridge Street, Peterboro.
Brocket, Mr. R. H., 41, Northumberland Street, Newcastle-on-Tyne.
Brooke, Mr. C., 5A, Walcot Street, Bath.
Brooke, Mr. W., Silver Street, Halifax.
Brookes, Mr. J. I. (Mr. T. J. Cutting), Selby.
Broom, Mr. W., 2, Queen Street, Exeter.
Brough, J. C., F.C.S., London Institution, Finsbury Circus, S.E.
Brown, Mr. A. J., 2, Trafalgar Terrace, Greenwich, S.E.
Brown, Mr. D. R., 1, St. John Street, Edinburgh.
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Brown, Mr. J. F., 37, Town Hall Street, Dover.
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Brownen, Mr. G., 143, New Bond Street, London, W.
Brownlow, Mr. A., 143, New Bond Street, London, W.
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Buck, Mr. R. C., 192, Breck Road, Liverpool.
Buckle, Mr. C. F., 77, Gray's Inn Road, W.C.
Buchanan, Mr. G., 139, Princess Street, Edinburgh.
Bull, Mr. B., High Street, Royston, Herts.
Bullen, Mr. T., 13, Hereford Road, Bayswater, W.
Bulmer, Mr. T., 4, Low-Ousegate, York.
Burch, Mr. W., High Street, West Bromwich.
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Burdon, Mr. J., Durham.
Burdwood, Mr. J., 30, Frankfort Street, Plymouth.
Burgess, Mr. R., Winsford, Cheshire.
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Burns, Mr. D. H., High Street, Arbroath.
Burrell, Mr. G., Bank Buildings, High Street, Montrose.
Burt, Mr. J., 61, Montague Street, Worthing.
Burton, Mr. J., 397, Cambridge Road, N.E.
Bush, Mr. T., Paulton, near Bristol.
Bushley, Mr. T., 41, Stockport Road, Manchester.
Butland, Mr. C., 153, St. Sidwell Street, Exeter.
Butler, Mr. J., jun., Great Bridge, Tipton.
Butler, Mr. J. G. (Messrs. Caley & Co.), London Street, Norwich.
Buzzard, Mr. T. H., 17, Market Place, Leicester.

Caley, Mr. A. J., 2, London Street, Norwich.
Callaway, Mr. L., Ipswich.
Calvert, Dr. F. C., F.R.S., Royal Institution, Manchester.
Calvert, Mr. R., Market Cross, Stokesley, Yorks.

Carlton, Mr. E. P., 8, High Street, Horncastle.
Carpenter, Mr. J. T., Teignmouth.
Carr, Mr. J., Market Place, Wakefield.
Carr, Mr. W., Upper George Street, Leicester.
Carruthers, Mr. R. B., 1, Egerton Crescent, Withington, Manchester.
Carson, Mr. R., 1, Market Place, Manchester.
Carteighe, M., F.C.S., 172, New Bond Street, W.
Carter, Mr. F. G. (address unknown).
Carter, Mr. F. P., 20, Charterhouse Square, W.C.
Carter, Mr. W., Cheetham Hill, Manchester.
Cartwright, Mr. W., Ironmarket, Newcastle-under-Lyme.
Casterton, Mr. J., Market Rasen.
Caswell, Mr. E., 37, Regent Street, Leamington.
Cawdell, Mr. G., 12, London Street, Hyde Park, W.
Chaplin, Mr. J. R., 124, High Street, Colchester.
Chapman, Mr. S. S., Broadway, Victoria Park, E.
Charity, Mr. W., 7, Fen Court, Fenchurch Street, E.C.
Chessall, Mr. R., Sidmouth.
Cheverton, Mr. G., Tunbridge Wells.
Chick, Mr. W., 5, Gloucester Terrace, South Norwood, S.E.
Chifney, Mr. G., Mildenhall, Suffolk.
Childs, Mr. W., Selhurst Road, South Norwood, S.E.
Chrispin, W., F.C.S., 39, King's Street, Huddersfield.
Christopher, Mr. W., Crickhowell.
Church, Mr. H. J., Cambridge.
Clapham, Mr. J., 40, Wade Lane, Leeds.
Clapp, Mr. E. F., 35, Church Street, Stoke Newington, N.
Clarabut, Mr. J. B., 171, Lower Street, Deal.
Clark, Mr. J. A., 11, Duncan Place, London Fields, Hackney, E.
Clark, Mr. J., 56, Hanover Street, Liverpool.
Clark, Mr. J. W., Belvoir Street, Leicester.
Clarke, Mr. G. B., Park Street, Woburn.
Clarke, Mr. R. F., 11, Strand, Torquay.
Clarke, Mr. T. M., Richmond, Surrey.
Clarke, Mr. T., 19, Market Place, Stockport.
Clarke, Mr. W. R., 3, Sheep Street, Northampton.
Claypole, Mr. A. H., York Town, Farnborough Station, Surrey.
Clayton, Mr. F. C., 29, Bath Row, Birmingham.
Clayton, Mr. W., 41, Wicker, Sheffield.
Cleave, Mr. W., Chudleigh.
Clift, Mr. E., Lee Bridge, Lewisham, S.E.
Clisby, Mr. S., High Street, Sandback.
Clough, Mr. J., Northwick.
Clowes, Mr. W. C., Attleborough.
Coates, Mr. J., 53, Clayton Street East, Newcastle-on-Tyne.
Cocker, Mr. J., 3, New James Street, Lynn.
Cocking, Mr. G., Ludlow.
Cocks, Mr. J. W., Lower Union Street, Torquay.
Cockton, Mr. J., High Street, Maryport.
Cohen, Mr. B. D., 56, Hanover Street, Liverpool.
Cohen, Mr. N. S., 56, Hanover Street, Liverpool.
Colbeck, Mr., Tickhill, Yorks.
Colby, Mr. J., senr., 101, Western Road, Brighton.
Cole, Mr. F., 4, High Street, Stoke Newington, N.
Coleman, Mr. A., 13, St. Mary-at-Hill, E.C.
Coles, Mr. F., South Kensington Museum, W.
Coley, Mr. S., 57, High Street, Stroud.
Collins, J., F.B.S.E., 17, Bloomsbury Square, W.C.
Collins, Mr. J. R., 81, Chalk-farm Road, N.W.

Colton, Mr. T., Grimsby, Lincolnshire.
Colton, Mr. T., Ousegate, Selby, Yorkshire.
Commans, Mr. R. D., George Street, Bath.
Constance, Mr. E., 37, Leadenhall Street, E.C.
Cooke, Mr. W., 27, St. Giles, Norwich.
Cooke, Mr. J., Besborough, near Cork.
Cooper, Mr. A., 18, Abington Terrace, Kensington, W.
Cooper, Mr. G., 101, Fore Street, Exeter.
Cooper, Mr. J. N., Mall, Clifton, near Bristol.
Cooper, Mr. S. H., West Hartlepool.
Cooper, Mr. T., Leicester.
Cooper, Mr. W. W., 2, Amherst Road, London, W.
Cordwin, Mr. W., Cinderford, Gloucestershire.
Corfield, Mr. T. J. T., St. Day, Cornwall.
Cornelius, Mr. R. B., 11, Regent Place, Teignmouth.
Cornell, Mr. W., Ipswich.
Cornish, Mr. W., 174, Western Road, Brighton.
Cossey, Mr. J., St. John's Norwich.
Cotton, Mr. J., Church Street, St. Helen's, Lancs.
Cottrill, Mr. G. J., Shepton Mallet.
Cottrill, Mr. J. W., 143, New Bond Street, W.
Cottrill, Mr. W. H., Snargate Street, Dover.
Coulter, Mr. G., Sedbergh, near Kendal.
Coupe, Mr. W., Post Office, Shoeburyness.
Coupland, Mr. J., High Harrogate.
Cox, Mr. H., 44, Strutton Ground, Westminster, S.W.
Cracknell, Mr. C., 107, Edgware Road, W.
Cragg, Mr. J., 46, Boar Lane, Leeds.
Craig, Mr. C., 32, Anne Street, Sunderland.
Craven, Mr. F., Batley Carr, Dewsbury.
Crawshaw, Mr. E., 30, Manchester Road, Burnley.
Crerar, Mr. J., Blairgowrie.
Cripps, Mr. J., 155, King Street, Hammersmith, W.
Crisp, Mr. F. A., 17, The Pavement, Clapham, S.W.
Crispin, Mr. W., Huddersfield.
Cromwell, Mr. O., Wandsworth Road, S.W.
Crotch, Mr. J., 74, Edgware Road, W.
Crow, Mr. E. L., Lee Bridge, Lewisham, S.E.
Crozier, Mr. W., 5, Grainger Street, Newcastle-on-Tyne.
Cruse, Mr. J. C., Canonbury Place, Islington, N.
Cryer, Mr. H., 2, Westbourne Grove, W.
Cubitt, Mr. C., Market Place, Norwich.
Cubley, Mr. G. A., Sheffield.
Cunliffe, Mr. J., Blackburn Street, Bolton.
Cunliffe, Mr. N., 41, Crook Street, Bolton.
Cupiss, Mr. F., Diss.
Currie, Mr. J., 70, Eglinton Street, Glasgow.
Currie, Mr. J., 331, Sauchiehall Street, Glasgow.
Curtis, Mr. W., Barnstaple.
Curtis, Mr. H., Lewes.
Curtiss, Mr. T., 35, Haymarket, S.W.
Curtiss, Mr. T. W., Holbeach, Lincolnshire.
Cutcliffe, Mr. G. F., Duke Street, Dartmouth.
Cutting, Mr. J., Leamington.
Cutting, Mr. S. F., Selby.
Cutting, Mr. T. J., Selby.

Daggers, Mr. F., 147, Church Street, Preston.
Dalgarno, Mr. P., Bevois Hill, Southampton.

Dalton, Mr. J. R., High Street, Stamford.
Daniel, Mr. J., 38, Rickergate, Carlisle.
Dann, Mr., Nottingham.
Darby, Mr. S., 140, Leadenhall Street, E.C.
Darling, Mr. W. H., 126, Oxford Street, Manchester.
D'Aubney, Mr. T., 82, Shepherdess Walk, Hoxton, N.
Davies, Mr. J. M., 1, Eversfield Place, St. Leonard's, Hastings.
Davies, E., F.C.S., Royal Institution, Liverpool.
Davies, Mr. J. H., Terrace Road, Aberystwith.
Davis, Mr. D. F., Leominster.
Davis, Mr. H., 19, Warwick Street, Leamington.
Davis, Mr. R. H., High Harrogate.
Davison, Mr. A., 205, St. John Street Road, E.C.
Davison, Mr. T., 95, St. Vincent Street, Glasgow.
Davy, Mr. H., High Street, Rotherham.
Dawson, Mr. O. R., Belle Vue, Southampton.
Dawson, Mr. W., Slough.
Day, Mr. T. S., Beckenham, Kent.
Dean, Mr. S., 320, Roman Road, Bow, E.
Deane, H., F.L.S., Clapham Common, S.W.
Deane, Mr. James, Clapham Common, S.W.
Dearden, Mr. W., Blackburn Street, Bolton.
Deck, Mr. A., 9, King's Parade, Cambridge.
Delf, Mr. T., Hardman Street, Liverpool.
Dennis, Mr. J. L., Alfreton Road, Nottingham.
Dennison, Mr. M., 222, High Street, Dudley.
De Putron, Mr. E. V. F., 143, New Bond Street, London, W.
Dewson, Mr. S., Birmingham.
Dickins, Mr. B., 221, West Derby Road, Liverpool.
Dickinson, Mr. J., Birkenhead.
Dingle, Mr. E., Bideford, Devon.
Diver, Mr. B., Isleham, Cambridgeshire.
Dobb, Mr. J. T., West Bar, Sheffield.
Dodds, Mr. N., Coldstream, N.B.
Dodwell, Mr. J., 11, Aldersgate Street, London, E.C.
Doig, Mr. W., 1, Castle Street, Dundee.
Dove, Mr. J., Sherbourne, near South Milford, Yorkshire.
Dowling, Mr. R., 224, High Street, Exeter.
Downward, Mr. J., Ulverston.
Downes, Mr. F. D., 9, Celbridge Place, Westbourne Park, W.
Dowsett, Mr. A., 16, North Street, Brighton.
Draper, H. N., F.C.S., 23, Mary Street, Dublin.
Dresser, Mr. R., Pavement, York.
Drew, Mr. S., 301, Park Road, Liverpool.
Driver, Mr. T., Woolton, Liverpool.
Druce, Mr. G. C., 6, The Drapery, Northampton.
Drury, Mr. G. S., 158, Parrock Street, Gravesend.
Duck, Mr. W. B., Gisborough, Yorks.
Dudden, Mr. R. M., Midsomer Norton, Bath.
Dulley, Mr. J., Worcester Street, Wolverhampton.
Dun, Mr. R. J., 288, Argyle Street, Glasgow.
Dunn, Mr. E., 83, High Street, Dudley, Staffordshire.
Dunmore, Mr. G. H., 81, Maiden Road, N.W.
Dunmore, Mr. J., Small Heath, Birmingham.
Durrant, Mr. G. R., Old Cross, Hertford.
Dutton, Mr. C., 25, Milsom Street, Bath.
Dutton, Mr. F., Market Place, Bolton.
Dutton, Mr. J., Rock Ferry, Birkenhead.
Dyer, Mr. A. J., 3, Acre Lane, West Brixton, S.W.
Dyer, Mr. W., Corn Market, Halifax.

Dymond, Mr. G., Bull Street, Birmingham.
Dyson, Mr. W. B., 4, Gloucester Road, South Kensington, W.

Earee, Mr. T., High Street, Staines.
Earland, Mr. W., Bexley, S.E.
Eastman, Mr. J. E., High Road, Tottenham, N.
Ebdell, Mr. T., Vicar Lane, Leeds.
Edisbury, Mr. J. F., Wrexham.
Edwards, Mr. E., 4, Portland Place North, Lower Clapham, E.
Edwards, Mr. J., Lewes Road, Brighton.
Ekin, C., F.C.S., 7, Argyle Street, Bath.
Ellinor, Mr. G., 41, Wicker, Sheffield.
Elliot, Mr. R., 279, High Street, Gateshead.
Ellison, Mr. J. B., 12, Queen Street, Barnsley.
Ellwood, Mr. M. J., Leominster.
Emerson, Mr. C., West Hartlepool.
Evans, Mr. A., Fore Street, Exeter.
Evans, Mr. E., jun., 56, Hanover Street, Liverpool.
Evans, Mr. E. P., Cleobury Mortimer.
Evans, H. S., F.C.S., 60, Bartholomew Close, London, E.C.
Evans, Mr. J. H., Watergate Flags, Chester.
Evans, Mr. J. H., Market Cross, Lymm, Cheshire.
Evans, Mr. J. J., 51, Fore Street, Taunton.
Evans, Mr. J. J., 56, Hanover Street, Liverpool.
Evans, Mr. J. R., 56, Hanover Street, Liverpool.
Exley, Mr. G., 48, Hunslet Lane, Leeds.
Eyre, Mr. A. B., Ipswich.
Eyre, Mr. S., 202, Infirmary Road, Sheffield.

Fairburn, Mr. J., Northallerton.
Fairlie, Mr. J. M., 17, St. George's Road, Glasgow.
Farnsworth, Mr. T., Codnor.
Farnworth, Mr. W., Blackburn.
Farr, Mr. J., Crown Street, Halifax.
Farrage, Mr. R., Rothbury, Northumberland.
Farrer, Mr. C., Aire Street, Castleford.
Faulkner, Mr. J. R., 9, Oxford Terrace, S.W.
Faull, Mr. E., Beeston.
Fawcett, Mr. J., Birkenhead.
Fawthorp, Mr. J. (Messrs. Hirst, Brooke & Hirst), Leeds.
Ferguson, Mr. J., 27, Highfield Street, Pownall Square, Liverpool.
Ferrero, Mr. A. P., 5, Western Hill, Durham.
Ferneley, Mr. C., 61, Tything, Worcester.
Ferrier, Mr. D. H., 3, Hilltown, Dundee.
Fever, Mr. F., High Street, Olney.
Fewtrell, W. T., F.C.S., 41, Gower Place, Euston Square, W.C.
Field, Mr. J., 56, Marine Parade, Brighton.
Finch, Mr. J., 150, High Street, Cheltenham.
Finlayson, Mr. T., Leith.
Fisher, Mr. J. J., 20, Bank Street, Carlisle.
Fisher, Mr. W., Horwich, Bolton.
Fisher, Mr. E., Ashton-under-Lyne.
Fitch, Mr. R. O., 9, Romsey Terrace, Well Street, South Hackney, E.
Fitch, Mr. R., F.G.S., F.S.A., Norwich.
Fitzhugh, Mr. R., F.C.S., Nottingham.
Fleeming, Mr. W., Wolverhampton.
Fleming, Mr. J., 27, Howard Street, Glasgow.
Fletcher, Mr. T., Smallthorne, Stoke-on-Trent.
Flood, Mr., 102, Blackman Street, S.E.
Flower, Mr. T. S., Thames Street, Kingston-on-Thames, S.W.
Floyd, Mr. T., Town Hall, Bury St. Edmund's.

Floyd, Mr. J., Soham.
Flux, Mr. W., 1, East India Avenue, E.C.
Ford, Mr. J., Kirriemuir.
Forster, Mr., Castle Street, Dover.
Foster, Mr. J., Collumpton.
Foster, Mr. J. A., 7, Wheeler Street, Birmingham.
Foulkes, Mr. W. J., Birkenhead.
Fox, Mr. W., 109, Bethnal Green Road, London, E.
Fox, Mr. G., Dawgreen, Dewsbury.
Francis, Mr. G. B., 5, Coleman Street, E.C.
Francis, Mr. G. B., Jun., 8, Nelson Terrace, Stoke Newington, N.E.
Francis, Mr. G., 1, Belle Vue Place, Great Malvern.
Francis, Mr. J., 54, High Street, Wrexham.
Frank, Mr. J. M., Byker Hill House, Newcastle-on-Tyne.
Franklin, Mr. A.
Frazer, Mr. A., 50A, Lord Street, Liverpool.
Frazer, Mr. D., 113, Buchanan Street, Glasgow.
Freeman, Mr. T. W., Ledbury, Herefordshire.
Freeman, Mr. R., 70, Kennington Park Road, London, S.E.
Froom, Mr. W. F., 75, Aldersgate Street, E.C.
Frost, Mr. G., 7, Corn Market, Derby.
Fudge, Mr. C. W., Shepton Mallet.
Furniss, Mr. T., 30, Oxford Street, Liverpool.

Gadd, Mr. H., High Street, Kingsland, N.E.
Gale, S., F.C.S., 338, Oxford Street, W.
Gardiner, Mr. J., London Street, Norwich.
Gardiner, Mr. J., 167, Mare Street, Hackney, E.
Gardner, Mr. J., 68, George Street, Edinburgh.
Gardner, Mr. J. T., St. James Street, Brighton.
Gare, Mr. C. H., Wolverhampton St., Dudley.
Garle, Mr. J., Bickley, Kent.
Geddes, Mr. W., 8, Market Place, Oldham.
Geldard, Mr. J., St. Austell.
Gee, Mr. G., High Street, Sandback, Cheshire.
George, Mr. H., 68, Broad Street, Worcester.
Gething, Mr. W. B., 75, Fleet Street, E.C.
Gibbons, Mr. G., Weston-super-Mare.
Gibson, Mr. C., Haydon Bridge, Carlisle.
Gibson, Mr. C. P., 16, Whitefriargate, Hull.
Gibson, Mr. J., 15, Sackville Street, Manchester.
Gilbert, Mr. G., Earl's Shilton, Hinckley.
Gilbertson, Mr. H., 72, Ludgate Hill, London, E.C.
Giles, Mr. G. J., 146, Regent's Park Road, N.W.
Giles, Mr. R. W., Clifton, near Bristol.
Gill, Mr. H., Boston Spa, Yorkshire.
Gill, Mr. S., 57, Broad Street, Pendleton, Manchester.
Gill, Mr. W., 1, West Street, Tavistock.
Gilling, Mr. J., Saffron Walden, Essex.
Ginns, Mr. A. B., Rothwell, Northamptonshire.
Gissing, Mr. T. W., Wakefield.
Gittoes, Mr. S. J., Park Villa, Wednesbury.
Glaisyer, Mr. T., 11, North Street, Brighton.
Glanfield, Mr. G., 97, Lower Union Street, Torquay,
Goddard, Mr. J., Leicester.
Godfrey, Mr. F., Newton Abbot.
Godfrey, Mr. H. E., 45, Curzon Street, Mayfair, W.
Gooch, Mr. W. P., 22, Hamilton Terrace East, Highbury, N.
Gooch, Mr. T., Leiston, Suffolk.
Good, Mr. T., 47, Minories, E.C.

Goodchild, Mr. R. S., Ph.D., Well Street, South Hackney, E.
Goodwin, Mr. J., 18, Muntz Street, Small Heath, Birmingham.
Goodwin, Mr. J., Lower Clapton, E.
Gordelier, Mr. P. W. G., Sittingbourne, Kent.
Gossop, Mr. G. K., 88, Church Street, Great Grimsby.
Gostling, Mr. T. P., Diss.
Goucher, J., F.L.S., 43, High Street, Shrewsbury.
Gould, F., F.L.S., Kingston-on-Thames, Richmond, S.W.
Gould, Mr. J., Red Lion Square, Newcastle-under-Lyme.
Goulden, Mr. E. B., 44, St. Peters Street, Canterbury
Gowland, Mr. G. R., High Street, Sheffield.
Gowland, Mr. W., High Street, Sheffield.
Grady, Mr. F., Villa Street, Hockley, Birmingham.
Grainger, Mr. E. J., Upper Clapton, N.E.
Grant, Mr. W., High Street, Blairgowrie.
Gray, Mr. C., Bilston, Staffordshire.
Greaves, Mr. A., Ironville.
Greaves, Mr. E., Mexbro, Rotherham.
Greaves, Mr. J., Matlock-Bath.
Greaves, Mr. W. S., Ironville.
Green, Mr. J., West Bromwich.
Green, Mr. W., Newton Abbot.
Greenall, Mr. A., 303, Breck Road, Liverpool.
Greenish, Mr. T., 20, New Street, Dorset Square, N.W.
Greenish, Mr. T. E., 20, New Street, Dorset Square, N.W.
Greensmith, Mr. S., Rugeley.
Greenwood, Mr. J., 22, Market Place, Louth.
Gregory, Mr. G. H., 15, East Street, Taunton.
Gregory, Mr. W., Rawmarsh, Rotherham.
Greig, Mr. W., Glassford Street, Glasgow.
Grieves, Mr. A. S., Spiceal Street, Birmingham.
Griffin, Mr. G. E., Deansgate, Bolton.
Griffiths, Mr. T., Bideford, Devon.
Grime, Mr. T., Bolton Road, Over Darwen.
Grisbrook, Mr. E., Windsor, Berks.
Grisbrook, Mr. S., 51, Wellington Street, Woolwich, S.E.
Grisdale, Mr. T., Daubhill, Bolton.
Grose, Mr. N. M., Wadebrige, Cornwall.
Gross, Mr. W., Bury St. Edmund's.
Groves, Mr. T. B., F.C.S., Weymouth.
Groves, Mr. W. E., Blandford, Dorset.
Guest, Mr. E. P., Brentwood, Essex.
Guest, Mr. G. C., 17, St. John's Square, Burslem.
Guest, Mr. W., 13, Carlton Street, Nottingham.
Gulliver, Mr. W., 33, Lower Belgrave Street, Pimlico, S.W.
Guthrie, Mr. P., 111, Sauchiehall Street, Glasgow.
Gunn, Mr. F. J., Axminster.
Guyer, Mr. J. B., 11, Strand, Torquay.
Gwatkin, Mr. J. T., 49, Grand Parade, Brighton.

Hadfield, Mr. J., 20, Cheetham Street, Rochdale.
Haines, Mr. J. J., Market Place, Bromsgrove.
Hall, Mr. F., 1, Jermyn Street, S.W.
Hall, Mr. H. R. F., 1, Beverley Road, near Hull.
Hall, Mr. J., 5, Russell Street, Liverpool.
Hall, Mr. T., 30, Bath Row, Westgate, Newcastle-on-Tyne.
Hall, Mr. T. H., 10, Grey Eagle Street, E.
Hall, Mr. S., 3, Alma Place, Eastbourne.
Hall, Mr., 102, Blackman Street, S.E.
Hallaway, Mr. J., 52, Castle Street, Carlisle.

Halley, Mr. A., 2, Cathedral Street, Glasgow.
Halliday, Mr. W. J., 65, Bury New Road, Manchester.
Halstead, Mr. A., Bank Street, Rawtenstall, Lancs.
Hambley, Mr. C. J., 20, Fore Street, Taunton.
Hambrook, Mr. J. B., 6, Stroud Street, Dover.
Hamer, Mr. J., Bradshawgate, Bolton.
Hamilton, Mr. H. B., 4, Compton Road, Wolverhampton.
Hamilton, Mr. J., 7, Caprera Place, Paisley Road, Glasgow.
Hamp, Mr. J., Worcester Street, Wolverhampton.
Hampson, Mr. R., 63, Piccadilly, Manchester.
Hampson, Mr. P., Great Moor Street, Bolton.
Hanbury, D., F.R.S., F.L.S., Plough Court, Lombard Street, E.C.
Hanbury, Mr. D. B., Plough Court, Lombard Street, E.C.
Handford, Mr. E., High Sreet, Torrington.
Handley, Mr. C., High Street, Stoke Newington, N.
Handcock, Mr. J., 38, Upperhead Row, Leeds.
Hardeman, Mr., 55, Bury New Road, Manchester.
Hardie, Mr. J., 68, High Street, Dundee.
Harburn, Mr. R. H., 51, Market Place, Bishop Auckland.
Harding, Mr. J. J., Sudbury, Suffolk.
Harding, Mr. R. O., Belvedere, Bath.
Hardman, Mr. W., 141, Woodhouse Lane, Leeds.
Hardwicke, Mr. E. J., 4, Meat Market, Bury St. Edmunds.
Hargraves, Mr. J., 14, Hardman Street, Liverpool.
Hargreaves, Mr. H. L., 30, High Street, Oldham.
Harrington, Mr. A., Needham Market, Suffolk.
Harris, Mr. M. C. J., West Street, Crewkerne.
Harris, Mr. E. R., 30, Richmond Place, Brighton.
Harris, Mr. H. W., 208, High Street, Rochester.
Harris, Mr. J., Eversham Street, Redditch.
Harrison, Mr. G., 1, Flat Street, Sheffield.
Harrison, Mr. J. P., 26, Scotch Street, Carlisle.
Harrison, Mr. J., Keswick.
Harrison, Mr. J., 33, Bridge Street, Sunderland.
Harrison, Mr. T., Sun Bridge, Bradford, Yorkshire.
Harrison, Mr. W. B., 6, Bridge Street, Sunderland.
Harrower, Mr. P., 136, Cowcaddens Street, Glasgow.
Hart, Mr. C. D., Derby.
Hartt, Mr. C., 11, Strand, Torquay.
Harvey, Mr. E., Giltspur Street, E.C.
Harvey, Mr. S., Canterbury.
Harvey, Mr. T., 4, Moorland Terrace, Leeds.
Harwood, Mr. E. G., 21, Newport Street, Bolton.
Haselden, Mr. A. F., 18, Conduit Street, W.
Hasselby, Mr. T. J., Aire Street, Goole, Yorkshire.
Hatch, Mr. R. M., Redland, Bristol.
Haworth, Mr. W., Oswaldtwistle, near Accrington.
Hayes, Mr. J., Great Warley, Essex.
Hayland, Mr. W. C., 21, High Ousegate, York.
Hayles, Mr. B. H., Esplanade, Ealing, Middlesex.
Hayward, Mr. C., Lincoln.
Hayward, Mr. W. H., Trowbridge, Wilts.
Heald, Mr. B., Sleaford.
Heap, Mr. R., 98, Deansgate, Bolton.
Hearder, Mr. H. P., 4, Westwell Street, Plymouth.
Hearder, Mr. W., 1, Victoria Parade, Torquay.
Heathfield, W. E., F.C.S., F.R.S.E., 8, Wilson Street, Finsbury, E.C.
Heaton, Prof. C. W., F.C.S., Charing Cross Hospital, W.C.
Hebb, Mr. S., Craven Terrace, Sale, Cheshire.
Hebden, Mr. W. C., Northgate, Halifax.

Hedley, Mr. J., Houghton-le-Spring.
Hedley, Mr. T., 14, Market Place, Ramsbottom.
Heidfield, Mr. O., 39, Chapel Walk, South Castle Street, Liverpool.
Hemingway, Mr. A., 20, Portman Street, W.
Hemingway, Mr. E., 20, Portman Street, W.
Hemingway, Mr. W. 20, Portman Street, W.
Henderson, Mr. C., Wibsey, near Bradford.
Henderson, Mr. M. J., Main St., Keswick.
Henderson, Mr. W. P., 114, Nethergate, Dundee.
Henshall, Mr. J., Post Office Place, Lymm, Cheshire.
Henty, Mr. H. M., 19, High Street, St. John's Wood, N.W.
Herring, Mr. H., 40, Aldersgate Street, E.C.
Heppell, Mr. H., 116, Tottenham Court Road, W.
Hetherington, Mr. A. A., 16, Cornwall Street, Plymouth.
Hibbert, Mr. J., 2, Bridgwater Street, Saint Helens, Lancs.
Hick, Mr. A., Wath-on-Dearne.
Hick, Mr. J., 3, Broadstones, Bradford.
Hickey, Mr. E. L., 199, King's Road, Chelsea, S.W.
Hickman, Mr. W., Archer Street, Kensington Park, W.
Higgins, Mr. W., 142, Bridge Street, Chester.
Hilditch, Mr. S. G., 31, Fleet Street, Liverpool.
Hill, Mr. A. (Messrs. Fitch & Son), Market Place, Norwich.
Hill, Mr. W., 41, Union Street, Bishopsgate, E.C.
Hill, Mr. A. B., 11, Little Britain, E.C.
Hill, Mr. J., 123, West Street, Sheffield.
Hill, Mr. T., Bath.
Hills, T. H., F.C.S., 338, Oxford Street, W.
Hinchcliffe, Mr. F. G. U., 77, Portland Street, Manchester.
Hinds, Mr. J., Coventry.
Hinds, Mr. W., Coventry.
Hinds, Mr. W. L., Kendal.
Hingston, Mr. A. H., Bold St., Liverpool.
Hitch, Mr. S., Smallthorne, Stoke-on-Trent.
Hitchman, Mr. H., Market Place, Kettering.
Hitchcock, Mr. C. E., 100, High Street, Oxford.
Hocken, Mr. J., 31, Old Hall Street, Liverpool.
Hobson, Mr. H., 64, Upper Rushall Street, Walsall.
Hodge, Mr. J., 249, Overgate, Dundee.
Hodges, Mr. W., Eastgate Row, Chester.
Hodgkinson, Mr. G., 11, Cross Cheaping, Coventry.
Hodgkinson, Mr. J. S., Matlock Bridge.
Hodgson, Mr. W., 1, Market Place, Manchester.
Hodkinson, Mr. J., Mill Street, Macclesfield.
Hodsoll, Mr. T. W. H., 17, Cross Street, Ashley Crescent, Hoxton.
Hoffe, Mr. P., 143, New Bond Street, London, W.
Holden, Mr. R., 30, Pavement, York.
Holder, Mr. A. H., Starcross, near Barnsley.
Holdsworth, Mr. T. W., Upper Priory, Old Square, Birmingham.
Holland, Mr. E., Irlams o' the Height, Manchester.
Holliday, Mr. T., West Bromwich.
Holloway, Mr. T. H., Upper Sydenham, S.E.
Holmes, Mr. F. G., Brill.
Holmes, Mr. J., 92, Meadow Lane, Leeds.
Holt, Mr. H., Flush, Heckmondwike.
Hope, Mr. W., Uppingham.
Hopkinson, Mr. T., Grantham.
Hopkin, Mr. W. K., 5, New Cavendish Street, W.
Hopton, Mr. E., Idle, Yorks.
Horncastle, Mr. J., 17, Craven Road, Westbourne Terrace, W.
Horncastle, Mr. H., 46, Folgate, Sheffield.

Horsfield, Mr. J. N., Sweet Street, Leeds.
Horsley, J., F.C.S., The Laboratory, Police Station, Cheltenham.
Horton, Mr. A. T., 181, Upper Parliament Street, Liverpool.
Houghton, Mr. T., High Street, Oxford.
Houghton, Mr. W., 100, Fishergate, Preston.
Howard, Mr. D., Stratford, E.
Howard, Mr. W. D., Stratford, E.
Howden, Mr. R., 78, Gracechurch Street, E.C.
Howell, Mr. M., 61, High Street, Peckham, S.E.
Howman, Mr. P., Winchcombe
Howorth, Mr. J., Market Place, Doncaster.
Hucklebridge, Mr. J. M., 116, Ebury Street, S.W.
Hughes, Mr. C. G., Cateaton Street, Manchester.
Hughes, Mr. L. S., 40, Aldersgate Street, E.C.
Humby, Mr. L. W., Market Place, Warminster.
Huggins, Mr. W. H., Wainfleet.
Hume, Mr. A., 118, Grey Steet, Newcastle-on-Tyne.
Humphries, Mr. C., 47, Lime Street, Liverpool.
Hunt, Mr. C., 29, Chapel Street, Belgrave Square, S.W.
Husband, Mr. M., 95, Fore Street, Exeter.
Hustwick, Mr. T. H., 9, West Derby Street, Liverpool.

Iberson, Mr. J., 18, Cheapside, Barnsley.
Ince, J., F.L.S., F.C.S., F.R.M.S., 34, Pembroke Road, Kensington, W.
Ince, the Rev. W. (The Rev. the Sub-rector, Exeter College), Oxford.
Ingall, Mr. J., Ashford, Kent.
Iredale, Mr. T., 90, York Street, Leeds.
Ismay, Mr. J., Groat Market, Newcastle-on-Tyne.
Ismay, Mr. J. G., Groat Market, Newcastle-on-Tyne.

Jaap, Mr. J., 268, Buchanan Street, Glasgow.
Jack, Mr. G., 98, King Street, Dundee.
Jacks, Mr. E., 161, Gower Street, W.C.
Jackson, Mr. C., Church Road, Acton, W.
Jackson, Mr. F. J., Bawtry.
Jackson, Mr. J. T., Middleton Road, Oldham.
Jackson, Mr. J., York Street, Heywood.
Jackson, Mr. R., Drury Hill, Nottingham.
Jackson, Mr. W., Crediton, Devon.
Jackson, Mr. W., Mansfield.
James, Mr. J. S., 15, Princess Street, Hanover Square, W.
Jameson, Mr. W. C., Market Place, Reading.
Jefferson, Mr. T., 17, The Pavement, Clapham Common, S.W.
Jeffrey, Mr. G., Tring, Herts.
Jenkins, Mr. J., Nottingham.
Jenkins, Mr. J. T., Denman Street, New Radford, Nottingham.
Jenkinson, Mr. J. H. D., 46, Duke Street, Sheffield.
Jenner, Mr. C. S., Honey Hill, Bury St. Edmunds.
Jessop, Mr. J., Corn Market, Halifax.
Jessop, Mr. T. H., 15, Princess Street, Hanover Square, W.
Jewell, Mr., 86, New Bond Street, London, W.
Job, Mr. C. F., Market Place, Wakefield.
Jobson, Mr. R., 117, Hinde Street, Newcastle-on-Tyne.
Johnson, Mr. B. M., 70, Tottenham Court Road, W.C.
Johnson, Mr. J., Brondesbury Terrace, Kilburn, N.W.
Johnson, Mr. A. E., 338, St. Vincent's Street, Glasgow.
Johnson, Mr. J. G., 18a, Basinghall Street, E.C.
Johnson, Mr. J. H., 7, Church Street, Liverpool.
Johnson, Mr. J. B., Uttoxeter.
Johnson, Mr. M., Hington, Liverpool.

Johnson, Mr. M., Oakenshaw, Clayton-le-Moors.
Johnson, Mr. T., 80, Walgate, Wigan.
Johnson, Mr. T. S., 75, Bury New Road, Manchester.
Johnson, Mr. W., 4, Derby Street, Leek, Staffordshire.
Jones, Mr. C., Bridge Street, Birkenhead.
Jones, Mr. E. H., 11, Broad Street, Bristol.
Jones, Mr. E. P., Rhyl.
Jones, Mr. R., 126, Bridge Street, Chester.
Jones, Mr. F., 83, Oxford Street, Liverpool.
Jones, Mr. G. W., 82, Bridge Street, Worksop.
Jones, Mr. J. H., 9, Finsbury Place North, E.C.
Jones, Mr. H. S., 139, Fulham Road, S.W.
Jones, Mr. R. G., Lye, Stourbridge.
Jones, Mr. S. U., 4, Upper Parade, Leamington.
Jones, T., F.G.S., F.R.A.S., Plumstead, Kent, S.E.
Jones, Mr. W., 157, Great Howard Street, Liverpool.
Jones, Mr. W. J., Jamaica Row, Birmingham.
Joy, Mr. F. W., 17, Duke Street, Cardiff.
Judd, W., F.C.S., 10, Bath Street, Leamington.

Kay, Mr. R., 7, Strand, Dawlish.
Kaye, Mr. H., Berry Brow, Huddersfield.
Kearnes, Mr. R. H., Swan Bank, Bilston.
Kemp, Mr. D., 106, High Street, Portobello, Mid-Lothian.
Kemp, Mr. J., 11, North Street, Brighton.
Kendall, Mr. F., Stratford-on-Avon.
Keene, Mr. E., 143, New Bond Street, London, W.
Kennedy, Mr. W., Irongate, Glasgow.
Kent, Mr. F. W., 31, Market Place, Devizes.
Kent, Mr. (Mr. Martin), Southampton Parade, Redland, Bristol.
Kernot, G. C., M.D., Chrisp Street, Poplar, E.
Kershaw, Mr. J., Neville Street, Southport.
Kerr, Mr. C., 56, Nethergate, Dundee.
Keyworth, Mr. G. A., Hadleigh House, Hastings.
King, Mr. J., Rock Ferry, Birkenhead.
King, Mr. H., 1, Churton Street, Vauxhall Bridge Road, S.W.
Kinninmont, Mr. A., 69, South Portland Street, Glasgow.
Kirkbride, Mr. W., Penrith, Cumberland.
Kirkup, Mr. T., 2, North Parade, Newcastle-on-Tyne.
Kitchin, Mr. A., King Street, Whitehaven.
Knapman, Mr. J., High Street, Exeter.
Knight, Mr. J., 91, City Road, E.C.
Knights, Mr. J. A., Stockton-on-Tees.
Knott, Mr. R., 1, Blackburn Road, Bolton.
Knowles, Mr. C. W., Market Place, Thorne, near Doncaster.
Knowles, Mr. H. W., Market Place, Cleckheaton.
Knowles, Mr. W. H. H., Upper Bridge, Holmfirth.

Laird, Mr. W., 30, West Port, Dundee.
Lake, Mr. J. H., High Street, Exeter.
Lake, Mr. W. P., 50A, Lord Street, Liverpool.
Lambert, Mr. J., Elvet, Durham.
Lance, Mr. W. N. G., 207, Copenhagen Street, Islington, N.
Langman, Mr. P., Chatteris, Cambridgeshire.
Langridge, Mr. T. B., Midhurst.
Large, Mr. J. H. 65, New North Road, London, N.
Lawrance, Mr. E., Welwyn, Herts.
Lawrence, Mr. H., 49, High Street, Kensington, W.
Lear, Mr. W. M., Argyle Street, Bath.
Leather, Mr. W., Derby Street, Bolton.

Lee, Mr. S. W., 5, Church Street, Liverpool.
Lees, Mr. J., 2, Upper Street, Islington, N.
Leete, Mr. W. W., Fallow Field, Manchester.
Le Feuvre, M. F., 33, Bath Street, Jersey.
Leicester, Mr. T., Burslem.
Leighton, Mr. J. H., 12, Elvet Bridge, Durham.
Lenton, Mr. W. H., East Dereham.
Leslie, Mr. J. B., 90, Broomhall Street, Sheffield.
Levick, Mr. G. A., Caistor, Lincolnshire.
Levie, Mr. A. M., Edinburgh, N.B.
Lewin, Mr. W., Whimple Street, Plymouth.
Lewis, Mr. H., St. Alban's, Herts.
Linder, Mr. C., 104, Strand, W.C.
Lindsey, Mr. F. C., 50, High Street, Taunton.
Ling, Mr. E., Esher, Surrey.
Linford, Mr. J. S., 146, Holborn Bars, E.C.
Lister, Mr. S., Great Horton, Southfield Lane, Bradford.
Littlewood, Mr. S., Sutton-in-Ashfield.
Livsey, Mr. A. E., 256, Vauxhall Road, Liverpool.
Loane, Mr. J., Dock Street, Leman Street, E.
Lockyer, Mr. G., High Street, Deptford, S.E.
Long, Mr., 34, Western Road, Hove, Brighton.
Long, Mr. A. T., Bognor, Sussex.
Long, Mr. H., 48, High Street, Notting Hill, W.
Long, Mr. H., 90, High Street, Croydon, S.E.
Longbottom, Mr. J., Chester-le-Street, Durham.
Lord, Mr. C., Todmorden, Lancashire.
Loveland, Mr. C., High Wycombe.
Lucas, Mr. J., 4, Colmore Row, Birmingham.
Luke, Mr. R. S., 65, Old Town Street, Plymouth.
Luke, Mr. W. P., 50A, Lord Street, Liverpool.
Lumby, Mr. A., Tranmere, Liverpool.
Lyon, Mr. R., Ipswich.

Macadam, S., Ph.D., F.R.S.E., F.C.S., Surgeons' Hall, Edinburgh.
Maccall, Mr. R. M., 113, Renfrew Street, Glasgow.
Mace, Mr. J., 3, St. James Street, Bacup.
Mackay, Mr. G. B., 47, Scouringburn, Dundee.
Mackay, Mr. J., 119, George Street, Edinburgh.
Mackereth, Mr. H. W., Ulverston.
Maggs, Mr. T. C., Yeovil.
McCulloch, Mr. F., Covent Garden Market, W.C.
McDonald, Mr. J., 34, Virginia Street, Glasgow.
M'Donald, Mr. K., Dunkeld.
M'Gregor, Mr. A., 47, Eglinton Street, Glasgow.
M'Millan, Mr. J. M., 9, Great Western Road, Glasgow.
Maltby, Mr., Lincoln.
McVitie, Mr. T., 7, Old Street, Liverpool.
Maleham, Mr. H. W., Sheffield.
Manby, Mr. G., 112, High Street, Southampton.
Manfield, Mr. W., Thirsk, Yorks.
Mangnall, Mr. W., care of Messrs. Bateson, Kendal.
Manning, Mr. T. D., Jun., Yeovil.
Marchant, Mr. C. F., Ipswich.
Marks, Mr. B., Royal Naval Hospital, Plymouth.
Marloy, Mr. F. W., Coventry.
Marreco, A.F., M.A., F.C.S., College of Medicine, Newcastle-on-Tyne.
Marsden, Mr. T. B., 200, York Street, Cheetham Hill Road, Manchester.
Marsh, Mr. J. H., 6, Milsom Street, Bath.
Marshall, Mr. R., 9, Market Place, Boston, Lincolnshire.

Marston, Mr. J. T., 99, London Wall, City, E.C.
Martin, Mr. F. R., Southampton Parade, Redland, Bristol.
Martin, Mr. N. H., 17, The Pavement, Clapham Common, S.W.
Martin, Mr. J., Ridgeway, Plympton St. Maurice.
Martin, Mr. T., 4, Quadrant Buildings, Lime Street, Liverpool.
Martindale, Mr. W., University College Hospital, W.C.
Mason, Mr. A., 38, George Street, Luton.
Mason, Mr. A. H., 56, Hanover Street, Liverpool.
Mason, Mr. H. C., 59, Fisher Gate, Preston.
Mason, Mr. J., Lansdowne Crescent, Bournemouth.
Mather, Mr. W., 109, Chester Road, Manchester.
Matthews, H., F.C.S., 60, Gower Street, W.C.
Matthews, Mr. J., 101, Western Road, Brighton.
Matthews, Mr. W., 1, Wigmore Street, W.
Maudsley, Mr. W., 260, Tottenham Court Road, W.
Maunder, Mr. R., 714, Rochdale Road, Manchester.
Maw, Mr. C., 11, Aldersgate Street, E.C.
Mayfield, Mr. J. T., Nottingham.
Mayger, Mr. W. D., 6, Regent's Square, Northampton.
Mayhew, Mr. J., Glastonbury.
Mayhew, Mr. T., Glastonbury.
Mays, Mr. R. J. J., 3, Market Place, South Shields.
Meadows, Mr. H., Gloucester.
Mellin, Mr. G., 16, Titchborne Street, Regent Street, W.
Mellin, Mr. J. P., Wimbledon.
Merrell, Mr. J., Queen's Terrace, Camden Road, N.
Merrett, Mr., 48, East Street, Brighton.
Merrikin, Mr. J., Beaufort Buildings, Bath.
Merry, Mr. W., Ilkeston, near Nottingham.
Merryweather, Mr. C., Leicester.
Merson, Mr., Jun., Paignton.
Metcalfe, Mr. A. A., Great Horton, Bradford, Yorkshire.
Metcalfe, Mr. C. L., Whitefriargate, Hull.
Metcalfe, Mr. W., 1, Market Place, Manchester.
Millar, Mr. F. C. M., Torquay.
Miller, Mr. T. S., Broughty Ferry, Dundee.
Millidge, Mr. W. H., 47, High Street, Newport, Isle of Wight.
Mills, Mr. R. M., Bourne, Lincolnshire.
Mills, Mr. J., Eastgate Row, Chester.
Milner, Mr. J. G., 14, Bridge Street, Hull.
Mitchell, Mr. J., 34, Virginia Street, Glasgow.
Mitchell, Mr. J., 195, Oxford Street, Manchester.
Mitchell, Mr. M. F., 31, London Street, Fitzroy Square, W.
Moffat, Mr. T. D., 3, Union Street, Glasgow.
Monkhouse, Mr. J., 10, London Street, Southport.
Mood, Mr. W. A., 41, Church Street, Hemstead.
Moody, Mr. J., 59, Church Street, Camberwell, S.E.
Moon, Mr. R. P., 54, Fossgate, York.
Moore, Mr. S., Broad Street, Worcester.
Morgan, Mr. G., Tamworth.
Morgan, Mr. W. J., 40A, New Street, Birmingham.
Morris, Mr. A., Ollerton, Newark.
Morris, Mr. E., Dolgelly.
Morris, Mr. G., 20, Boundary Road, St. John's Wood, N.W.
Morris, Mr. J. O., 37, Digbeth, Walsall.
Morris, Mr. T., Farnworth, Bolton.
Morson, T., F.C.S., 124, Southampton Row, W.C.
Morson, Mr. T. N. R., F.L.S., 38, Queen Square, Bloomsbury, W.C.
Mortimer, Mr. J., 1, Mall Place, Clifton, near Bristol.
Morton, Mr. S., Ramsbottom.

Morton, Mr. H., Harbour Street, Ramsgate.
Moss, Mr. J., Market Street, Chorley.
Moss, Mr. J., 17, Bloomsbury Square, W.C.
Moss, Mr. J., English Street, Carlisle.
Moss, Mr. W., English Street, Carlisle.
Mullock, Mr. R., Birkenhead.
Mumbray, Mr. H. G., Great Cheetham Street, Higher Broughton, Manchester.
Mumby, Mr. C., 47, High Street, Gosport.
Munro, Mr. G., Lochee, Dundee.
Murdock, Mr. G., 143, Sauchiehall Street, Glasgow.
Muskett, Mr. J., Harleston, Norfolk.
Musson, Mr. T. J., Highgate, Birmingham.

Napier, Mr. G. L., 40, South Street, Exeter.
Narracott, Mr. H., Torquay.
Negus, Mr. S., 55, Gold Street, Northampton.
Nesbit, Mr. J., 172, High Street, Portobello.
New, Mr. W. W., 238, Essex Road, Islington, N.
Newbigen, Mr. J. L., Alnwick.
Newby, Mr. R. J., Castlenau, Barnes, S.W.
Newey, Mr. J. T., 78, Clarendon Road, Notting Hill, W.
Newman, Mr. R., Lod Street, Bewdley.
Newman, Mr. W. F., 13, Market Street, Falmouth.
Newsholme, Mr. W., Bradford, Yorkshire.
Nicholson, Mr. A., 11, Pantiles, Tunbridge Wells.
Nicholson, Mr. E., 1, Market Place, Manchester.
Nicholson, Mr. G. D., Red Lion Street, Aylsham.
Nicholson, Mr. H., Birkenhead.
Nicholson, Mr. J. J., High Street, Sunderland.
Nicholson, Mr. S., Aylsham, Norfolk.
Nicol, Mr. J., 21, Dundas Street, Edinburgh.
Noakes, Mr. R., 35, North Street, Brighton.
Noble, Mr. J., 63, Kings Street, South Shields.
Nock, Mr. J., Cradley Heath.
Norrish, Mr. J., Wandsworth, S.
Nowers, Mr. E., Lydd, East Kent.
Nurse, Mr. U. S., Eye, Suffolk.
Nurthen, Mr. F. R., 390, Strand, London, W.C.
Nutt, Mr. A. J., 47, Piccadilly, W

Oakland, Mr. W., Alfreton Road, Nottingham.
Oldham, Mr. J., Mansfield, Notts.
Oldham, Mr. P., Crook Street, Bolton.
Oldham, Mr. W., 38, Waterloo Road, Burslem.
Oldfield, Mr. F., 71, Newborough Street, Scarborough.
Orchard, Mr. E. J., Salisbury.
Orpe, Mr. T., 329, Old Kent Road, S.E.
Orren, Mr. S., Leominster.
Orton, Mr. T. J., 27, Regent Street, Leamington, Warwickshire.
Owen, Mr. J., 234, Upper Street, Islington, N.
Owen, Mr. W., 26, Collingwood Street, Newcastle-on-Tyne.
Owen, Mr. J., Bishops Castle, Salop.
Owles, Mr. J., Great Yarmouth.
Owles, Mr. J. J., Great Yarmouth.
Padwick, Mr. T., 5, Preston Street, Brighton.
Padwick, Mr. T., Redhill.
Pain, Mr. J. H., Hadleigh, Suffolk.
Paine, Mr. S., 1, Market Place, Manchester.
Palk, Mr. J., Southernhay, Exeter.

Palmer, Mr. F. W., Ramsey, Hunts.
Panes, Mr. G., Southborough, Tunbridge Wells.
Park, Mr. W., Broughty Ferry, Dundee.
Parker, Mr. J. E., 15, Greenfield Road, Stoneycroft.
Parker, Mr. M., 37, Sandhill, Newcastle-on-Tyne.
Parker, Mr. S., Alfreton Road, Nottingham.
Parker, Mr. W. H., 1, Milton Terrace, Alfreton Road, Nottingham.
Parkinson, Mr. R., 1, William Henry Street, Soho, Liverpool.
Parkinson, Dr. R., Bradford, Yorkshire.
Parr, Mr. S., Long Row, Nottingham.
Parrott, Mr. J., 44, Camberwell Road, E.
Pars, Mr. R. C., Thrapstone.
Parsons, Mr. F., Leicester.
Pass, Mr. H., Wandsworth Road, S.
Passmore, Mr. F. R., 82, King's Road, S.W.
Patchitt, Mr. E. C., Ilkeston Road, Nottingham.
Paterson, Mr. W., 114, St. Aldate's, Oxford.
Pattinson, Mr. F., Rock Ferry, Birkenhead.
Pattison, Mr. G., 139, St. John Street Road, E.C.
Paul, Dr. B. H., 17, Bloomsbury Square, W.C.
Payne, Mr. A., Galen Chemical Works, Ettingshall, near Wolverhampton.
Payne, Mr. J. B., Castle Northwich, Cheshire.
Payne, Mr. S., Wallingford, Berkshire.
Pearce, Mr. J. A., Cainscross, Stroud.
Pearce, Mr. J., 47, North Street, Taunton.
Pearce, Mr. J., Crewkerne.
Pearse, Mr. T., Gloucester.
Pearson, Mr. E., 143, New Bond Street, W.
Peake, Mr. H., New Bridge, Dover.
Peake, Mr. R., The Strand, Walmer, Kent.
Pedler, Mr. A., 199, Fleet Street, E.C.
Peel, Mr. A., 385, Stockport Road, Manchester.
Peggs, Mr. J. O., Golden Ball Street, Norwich.
Penrouse, Mr. E., West Bromwich.
Penrose, Mr. A. P., 5, Amwell Street, E.C.
Penney, Mr. W., Poole.
Peppercorn, Mr. B., Lincoln.
Perry, Mr. G. E., 222, High Street, Dudley.
Phillips, Mr. J., 154, Marine Parade, Brighton.
Phillips, Mr. J., Crewe.
Phillips, Mr. J., Church Stretton, Salop.
Phillips, Mr. T., Shrewsbury.
Pickrell, Mr. G., Docking, near Lynn, Norfolk.
Pierson, Mr. C., Scott House, Hunslet, Leeds.
Pilley, Mr. S., 9, Bargate, Boston.
Pitman, Mr. J., 50, Redcliff Hill, Bristol.
Pitts, Mr. R. C., 8, St. Giles Street, Norwich.
Plomley, Mr., High Street, Rye.
Plummer, Mr. E., High Street, Peckham, S.E.
Poingdestre, Mr. C. R., 187, Newington Butts, S.E.
Poll, Mr. W. S., Yarmouth, Norfolk.
Poole, Mr. H., 10, Bond Street, Weymouth, Dorset.
Pooley, Mr. J. C., 8, George Street, Bath.
Postans, Mr. A. P., 3, Lower Sackville Street, Dublin.
Potts, Mr. R. S., Ilkeston.
Potts, Mr. T., 5, Grainger Street, Newcastle-on-Tyne.
Potter, Mr. J., 26, Dudley Grove, W.
Poulton, Mr. J., Countenay Street, Newton Abbot.
Powers, Mr. E., Priory Works, Coventry.

Pownall, Mr. T. R., 45, St. George's Road, Bolton.
Pratt, Mr. G. W., 9, Cavendish Street, Chorton-on-Medlock, Manchester.
Preston, Mr. J., Sheffield.
Price, Mr. W., 157, Bromsgrove Street, Birmingham.
Pridmore, Mr. T., Castle Street, Hinckley, Leicestershire.
Priestley, Mr. J., 12, Deansgate, Bolton.
Prince, Mr. H., 5, Fore Street, Taunton.
Proctor, Mr. B. S., 11, Grey Street, Newcastle-on-Tyne.
Proctor, Mr. S. J., Great Malvern.
Prosser, Mr. E. T., Head Street, Colchester.
Provost, Mr. J. P., High Street, Huntingdon.
Pullan, Mr. T., Lumb Lane, Bradford, Yorkshire.
Pullin, Mr. W. H., 115, Warwick Street, Leamington.

Quarrington, Mr., Bath.
Queenboro, Mr. J., 30, West Street, Boston, Lincolnshire.
Quiller, Mr. C. R., 15, Sloane Square, S.W.

Rabson, Mr. H., Dulwich, Surrey, S.E.
Radford, Mr. J. C., 56, Fore Street, Devonport.
Radley, Mr. W. V., 74, Market Place, Sheffield.
Raimes, Mr. R., Leith Walk, Edinburgh.
Rainey, Mr. E., Spilsby.
Randall, W. B., F.C.S., 146, High Street, Southampton.
Ransom, Mr. W., Hitchin.
Rastwick, Mr. J., West Street, Southsea, Hants.
Rayner, Mr. J., Long Row, Nottingham.
Rayson, Mr. H., Wanstead, Essex.
Read, Mr. J., Salisbury.
Readwin, T. A., F.G.S., &c., 12, Wynne Road, Brixton, S.
Redfern, Mr. T., Penrith.
Redford, Mr. A., 30, Oxford Street, Liverpool.
Redford, Mr. G. A., 30, Oxford Street, Liverpool.
Redwood, Prof. T., Ph.D., 17, Bloomsbury Square, W.C.
Reed, Mr. C. W., High Street, Lewisham, S.E.
Reeve, Mr. O. J., Newhaven, Sussex.
Reid, Mr. N., 39, George Street, Perth.
Reynolds, Mr. J. J., 3, Hanover Street, W.
Reynolds, R., F.C.S., 13, Briggate, Leeds.
Rich, Mr. T., Weston-super-Mare.
Richardson, Mr. G., 12, Norland Place, Notting Hill, W.
Richardson, J. G. F., F.C.S., Friar Lane, Leicester.
Richardson, Mr. J., Knowsley Street, Bolton.
Richardson, Mr. J. H., 3, Arundel Crescent, Cork.
Riddel, Mr. W. R., Market Place, Hexham.
Ridley, Mr. H., Princes Risboro', Bucks.
Rimmington, Mr. F. M., Bradford, Yorkshire.
Ritches, Mr. T., 1, Victoria Parade, Torquay.
Ritchie, Mr. J. M., 35, Victoria Street, Derby.
Robbins, Mr. J., 372, Oxford Street, W.
Roberts, Mr. A. J., 270, Walworth Road, S.
Roberts, Mr. G., West Bromwich.
Roberts, Mr. J. B., Bourne, Lincolnshire.
Roberts, Mr. J., Middleton, Lancashire.
Robertson, Mr. F. F. L., 302, Camberwell Road, S.
Robinson, Mr. A. F., 2, Northgate, Darlington.
Robinson, Mr. B., 1, Broad Street, Pendleton, Manchester.
Robinson, Mr. H., 1, Canning Street, Liverpool.
Robinson, Mr. J., Orford Hill, Norwich.

Robinson, Mr. J., Chester-le-Street, Durham.
Robinson, Mr. J. F., 9, Orange Court, Castle Street, Liverpool.
Robinson, J. R., LL.D., F.R.G.S., Westgate, Dewsbury.
Robinson, Mr. J. S., 1, Eversfield Place, St. Leonard's, Hastings.
Robinson, Mr. J. S., Alfreton.
Robinson, Mr. R., Rochdale.
Robson, Mr. J. C., 25, Queen Street, Darlington.
Roddam, Mr. H. R., Ropery Banks, North Shields.
Rogers, Mr. A. R., Newmarket.
Rogers, Mr. S., Shaldon, near Teignmouth.
Rogers, Mr. W. H., Colyton.
Rogers, Mr. W. S., 42, Wish Street, Southsea.
Rogerson, Mr. M., Bradford, Yorkshire.
Romans, Mr. T. W., 55, Westgate, Wakefield.
Rookledge, Mr. J., Easingwold.
Rose, Mr. A., 441, Edgware Road, W.
Rose, Mr. A., 251, Sauchiehall Street, Glasgow.
Ross, Mr. L. B., Great Driffield.
Rossiter, Mr. F., 20, George Street, Hastings.
Row, Mr. G., St. Stephen's, Norwich.
Rowe, Mr. P. M., Marlborough.
Rowe, Mr. R., 40, Alfred Place West, South Kensington, S.W.
Russell, Mr. C. J. L., Windsor.
Russell, Mr. D., 97, Nethergate, Dundee.
Ryder, Mr. T. F., 62, Market Street, Manchester.

Sainsbury, Mr. E., 176, Strand, W.C.
Sainsbury, Mr. S., 176, Strand, W.C.
Salisbury, Mr. W. B., 3, Market Street, Leicester.
Salmon, Mr., 30, Western Road, Hove, Brighton.
Salter, Mr. G., 29, Red Lion Square, W.C.
Samuel, Mr. A. H., 56, Hanover Street, Liverpool.
Sandall, Mr. W., 2, Drapery, Northampton.
Sandeman, Mr. P., 17, High Street, Dundee.
Sandford, Mr. G. W., 47, Piccadilly, W.
Sandiland, Mr. R. B., Bicester, Oxfordshire.
Sands, Mr. J., Plough Court, Lombard Street, E.C.
Sangster, Mr. A., 66, High Street, St. John's Wood, N.W.
Sapp, Mr. A., Basingstoke.
Sapp, Mr. J. J., Palmerston Road, Southsea.
Sarsfield, Mr. W., Winton Street, Durham.
Saunders, Mr. E. C. (of Kingston, Ont.), 7, The Polygon, Clifton, Bristol.
Saunders, Mr. S. P., Bradford-on-Avon, Wilts.
Savage, Mr. W. D., 65, Edward Street, Brighton.
Saville, Mr. J., Howden.
Savory, Mr. C. H., 143, New Bond Street, W.
Savory, Mr. J., 143, New Bond Street, W.
Saxby, Mr. H., jun., Lewes, Sussex.
Schacht, Mr. G. F., 7, Regent's Place, Clifton, near Bristol.
Schacht, Mr. W., 6, Finsbury Place, South, E.C.
Schweitzer, Mr. J., 86, King's Road, Brighton.
Scott, W. L., F.C.S., Moreton-in-Marsh, Gloucestershire.
Seaman, Mr. J. S., Marlow.
Searby, Mr. W., White Lion Street, Norwich.
Seccombe, Mr. F., Fore Street, Totnes, Devon.
Sells, Mr. R. J., Tunbridge Wells.
Severs, Mr. J., 23, Stricklandgate, Kendal.
Seward, Mr. W., High Town, Hereford.
Sharp, Mr. C., Queen's College, Liverpool.

Sharpe, Mr. D. B., Borough Road, Sunderland.
Sharpe, Mr. G. Y., 34, High Street, Notting Hill, W.
Sharples, G. W., 7, Central Beach, Blackpool.
Shaw, Mr. H. W., (Messrs. Dunhill & Son), Doncaster.
Shaw, Mr. J., 24, Great George Place, Liverpool.
Shaw, Mr. R., Seacomb, Birkenhead.
Sheldon, Mr. A., 7, Bath Street, Walsall.
Shelley, Mr. H., 2, Church Street, Twickenham.
Shephard, Mr. T. F., 37, All Saints' Road, Westbourne Park, W.
Shepheard, Mr. T., 12, Bridge Street Row, Chester.
Shepperley, Mr. J., jun., 58, Long Row, Nottingham.
Shields, Mr. J., 372, Vauxhall Road, Liverpool.
Shipman, Mr. J. J., 22, Bridge Street, Northampton.
Shirtliff, Mr. W., 6, Brooklyn Terrace, Shepherd's Bush, W.
Shorrock, Mr. R., 6, Market Street, Over Darwen, Lancashire.
Siebold, Mr. L., 225, Oxford Street, Manchester.
Silson, Mr. R. W., 213, Church Street, Manningham, Bradford.
Silverlock, Mr. H., 92, Blackfriars Road, S.E.
Silvers, Mr. G., Gaol Street, Yarmouth.
Silvester, Mr. H. T., Knutsford, Cheshire.
Simmonds, Mr. P. L., 29, Cheapside, E.C.
Simmons, Mr. A., care of Mr. Harris, Redditch, Birmingham.
Simpson, Mr., 52, North Bridge, Edinburgh.
Simpson, Mr. A. L., Stowmarket.
Simpson, Mr. H. D., 2, New Street, Louth.
Simpson, Mr. J. W., 212, New City Road, Glasgow.
Simpson, Mr. T., Forest Hill, S.E.
Sims, Mr. J., Hirwain.
Sinclair, Mr. G., 29, South Portland Street, Glasgow.
Sindall, Mr. J. W., High Street, Knaresborough.
Skipper, Mr. E., 169, Hemingford Road, N.
Skoulding, Mr. G. S. F., Church Plain, Yarmouth.
Slack, Mr. J., Scotch Street, Carlisle.
Slack, Mr. J. L., Prescott.
Slater, Mr. T., Stone, Staffordshire.
Sleggs, Mr. G. R., 58, Queen's Road, Everton, Liverpool.
Slingsby, Mr. C. S., Bridge Street, Hindley.
Slugg, Mr. J. T., 242, Stretford Road, Manchester.
Smallwood, Mr. J. W., 76, Mill Street, Macclesfield.
Smart, Mr. J., Nicholas Cliff, Scarborough.
Smeeton, Mr. W., 26, Commercial Street, Leeds.
Smith, Mr. W., Sutton Coldfield.
Smith, Mr. H., 205, St. John Street Road, E.C.
Smith, Mr. D., 54, High Street, Stroud, Gloucester.
Smith, Mr. J. S. T. W., Meal Market, Hexham.
Smith, Mr. W. F., 280, Walworth Road, S.
Smith, Mr. A., 39, Ann Street, Birmingham.
Smith, Mr. E., 8, The Strand, Torquay.
Smith, Mr. F. D., Magdalen Street, Norwich.
Smith, Mr. J. D., Magdalen Street, Norwich.
Smith, Mr., 3, Lower Parade, Leamington.
Smith, Mr. R. B., Market Place, Norwich.
Smith, Mr. T. J., F.G.S., F.L.S., 10, North Church Side, Hull.
Smith, Mr. W., 3, Celbridge Place, Paddington, W.
Smith, Mr. W., 83, Western Road, Brighton.
Smith, Mr. W., Market Place, Nottingham.
Smith, Mr. W. L., Cotishall, Norfolk.
Smith, Mr. C. S., Cirencester.
Smith, Mr. T., Heriot Hill House, Edinburgh.

Snape, Mr. E., Great Hampton Street, Birmingham.
Snowden, Mr. R., 52, Robertson Street, Hastings.
Soames, Mr. W., Wargrave, Henley-on-Thames.
Southall, Mr. W., Bull Street, Birmingham.
Southall, Mr. A., Bull Street, Birmingham.
Sowerby, Mr. J., 78, English Street, Carlisle.
Sparrow, Mr. W. C. F., 2, Ranelagh Terrace, Pimlico, S.W.
Spavould, Mr. E., 15, Fowler Street, Rye Bank, Sheffield.
Sprackett, Mr. G., The Drawbridge, Bristol.
Spearing, Mr. J., 53, Above Bar, Southampton.
Squire, Mr. J., 35A, Peascod Street, Windsor.
Squire, Mr. W., 5, Coleman Street, E.C.
Squire, Mr. W., Swinefleet, Goole.
Stable, Mr. R. H., New Park Street, Southwark, E.C.
Staffell, Mr. H., Dunstable.
Stanford, Mr. E.C.C., F.C.S., Edinbarnet, Duntocher, Dumbartonshire.
Stansfield, Mr. R., 71, Steeles Terrace, Haverstock Hill, N.W.
Stanswood, Mr. J., 265, Commercial Road, Landport.
Stanthorpe, Mr. W. W., Corbridge-on-Tyne.
Stanway, Mr. W. H., Kington, Herefordshire.
Staning, Mr. W., 55, Cogan Street, Hull.
Staples, Mr. C., 47, High Street, Fulham, S.W.
Staples, Mr. E., Wilton.
Stark, Mr. J. S., 9, Clayton Street, Newcastle-on-Tyne.
Starling, Mr. H. W., 1, Lancaster Gate, Hyde Park, W.
Stead, Mr. B., 20, Upper Head Row, Leeds.
Stead, Mr. T., Bradford, Yorks.
Steele, Mr. E. B., Leeds.
Steven, Mr. D. P., 133, St. George Street East, London, E.
Stevens, Mr. F., 4, Union Street, Bristol.
Stevens, Mr. W. G., 53, North Street, Brighton.
Stevens, Mr. J. A., Trowbridge, Wilts.
Stevens, Mr. P. A., 70, Hyde Road, Hoxton, N.
Stevens, Mr. A. J., 187, Parroch Street, Gravesend.
Stevenson, Mr. W., 165, Edgeware Road, W.
Steward, Mr. A., Market Place, Yarmouth.
Steward, Mr. J., Trimpley, near Bewdley.
Steward, Mr. W. A., High Town, Hereford.
Stiles, Mr. W. H., Doncaster.
Stockings, Mr. A., St. Stephen's, Norwich.
Stoddart, W. W., F.C.S., F.G.S., 9, North Street, Bristol.
Stone, Mr. C., Royston.
Stone, Mr. J., Hounslow.
Storrar, Mr. D., 228, High Street, Kirkaldy.
Stott, Mr. W., Sowerby Bridge.
Sterriker, Mr. J., Driffield.
Strachan, Mr. J. L., 25, High Street, Gosport.
Straughton, Mr. J., 41, Main Street, Cockermouth.
Strawson, Mr. G. F., 101, High Holborn, London, W.C.
Stronge, Mr. R., 28, Grosvenor Street, Bolton.
Sumner, Mr. R. M., 50A, Lord Street, Liverpool.
Sumner, Mr. R., 50A, Lord Street, Liverpool.
Sussum, Mr. F., 6, Market Hill, Cambridge.
Sutter, Mr. E., 29, Red Lion Square, W.C.
Sutton, Mr. C. W., Stowmarket.
Sutton, F., F.C.S., Bank Plain, Norwich.
Sutcliffe, Mr. J., 154, Larkhall Lane, Clapham, S.W.
Sutcliffe, Mr. R., Hanson Lane, Halifax.
Swan, Mr. J., Mosley Street, Newcastle-on-Tyne.
Swenden, Mr. J., 14, High Row, Darlington.

Swinn, Mr. C., Royston, Herts.
Symes, Dr. C., York Place, Birkenhead.

Tait, Mr. W., 139, Princes Street, Edinburgh.
Tamplin, Mr. E. C., Kingston-on-Thames.
Tanner, Mr. A., 23, Prescott Road, Fairfield, Liverpool.
Tanner, Mr. N. W., 246, High Street, Exeter.
Tate, Mr. A. N., 7, Irwell Chambers, Liverpool.
Taubman, Mr. R., 33, Southampton Row, London, W.C.
Taubman, Mr. H. A., 124, Southampton Row, London, W.C.
Taylor, Mr. B., Briggate, Leeds.
Taylor, Mr. E., Droitwich.
Taylor, Mr. F., 3, Concert Street, Liverpool.
Taylor, Mr. G. S., 13, Queen's Terrace, St. John's Wood, N.W.
Taylor, Mr. H., Flowergate, Whitby.
Taylor, Mr. H. H., Linthorpe Road, Middlesboro-on-Tees.
Taylor, Mr. J., 13, Baker Street, W.
Taylor, Mr. J. H., Harrogate.
Taylor, Mr. R., Paradise House, Oxford.
Taylor, Mr. S., Market Place, Westbury, Wilts.
Taylor, Mr. S., 1, Great George Street, Leeds.
Taylor, Mr. T., Newport Pagnell.
Taylor, Mr. T., 81, High Street, Peckham, S.E.
Taylor, Mr. T. H., 2, St. Ann's Square, Manchester.
Taylor, Mr. W., 88, Deansgate, Bolton.
Taylor, Mr. W. G., Hungerford, Berks.
Teed, Mr. D., Exmouth.
Temperly, Mr. T., 107, Pilgrim Street, Newcastle-on-Tyne.
Terry, Mr. T., 1, Egerton Crescent, Withington, Manchester.
Thomas, Mr. J., Bridge, Kent.
Thomas, Mr. R., 143, High Street, Merthyr.
Thomas, R. W., F.C.S., 10, Pall Mall, S.W.
Thompson, Mr. A., 33, English Street, Carlisle.
Thompson, Mr. C. H., Maidenhead.
Thompson, Mr. E., 1, King Street, Dover.
Thompson, Mr. G., Alston.
Thompson, Mr. J., 11, Aldersgate Street, E.C.
Thompson, Mr. J., Knaresboro', Yorkshire.
Thompson, Mr. J. T., Richmond, Yorkshire.
Thompson, Mr. T., Market Place, Richmond, Yorks.
Thompson, Mr. W. M., Thirsk.
Thornley, Mr. C., Stow-on-the-Wold.
Thornton, Mr. S., Beacon, Exmouth, Devon.
Thrower, Mr. E. A., Diss.
Thurlby, Mr. G., King Street, Yarmouth.
Tibbs, Mr. F., 47, Blackfriars Road, S.
Tichborne, C. R. C., F.C.S., 40, Mary Street, Dublin.
Tidman, Mr. W., 10, Wormwood Street, E.C.
Tighe, Mr. H. W., High Street, Exeter.
Tilden, W. A., B.Sc., F.C.S., 17, Bloomsbury Square, W.C.
Tipping, Mr. H. J. W., High Street, Stoke Newington, N.
Titley, Mr. T., 44, Charlotte Street, Goodge Street, W.
Todd, Mr. J., English Street, Carlisle.
Todd, Mr. R. P., 16, Robertson Street, Hastings.
Tollinton, Mr. R. B., York.
Tomlinson, Mr. G. D., Bristol Road, Birmingham.
Tomlinson, Mr. W., 108, Patrick Street, Cork.
Toone, Mr. J. H., Granby Street, Leicester.
Towerzey, Mr. A., 2, Fairlawn Buildings, Weston-super-Mare.
Townsend, Mr. C., 4, Union Street, Bristol.

Trake, Mr. W. H., Kingsbridge, Devon.
Trotman, Mr. A. C., 16, Cambridge Street, Hyde Park Square, W.
Troughton, Mr. C., 72, Old Hall Street, Liverpool.
Truman, Mr. F. W., 187, Newington Butts, S.E.
Tuck, Mr. J., 114, St. Aldate's, Oxford.
Tully, Mr. J., Senr., East Grinstead, Sussex.
Tupholme, Mr. J. T., 38, Lamb's Conduit Street, W.C.
Turner, Mr. A., Fairfield, Liverpool.
Turner, Mr. G., Honiton.
Turner, Mr. J., 386, High Street, Lincoln.
Turner, Mr. J., Aylesbury.
Turner, Mr. J. A., Whitfield Road, Liverpool.
Turney, Mr. S. B., Plymouth.
Tuson, Prof. R.V., F.C.S., Royal Veterinary College, Camden Town, N.W.
Twinberrow, Mr. J. K., 80, Wigmore Street, Cavendish Square, W.
Twinberrow, Mr. J., 53, Broad Street, Worcester.
Tylee, Mr. J. P., Bath.
Tyrer, Mr. P., 90, Albert Road, Dalston, E.

Umney, C., F.C.S., 40, Aldersgate Street, E.C.
Uppleby, Mr. H., 6, Victoria Street, Leamington.
Upton, Mr. E. J., Wallingford, Berks.
Utley, Mr. A., 6, Mount Vernon Road, Liverpool.

Vergo, Mr. C., The Foregate, Worcester.
Verity, Mr. R., 35, Warwick Street, Regent Street, W.
Voce, Mr. W. G., Dudley Street, Brierley Hill.

Wade, Mr. J., 174, Warwick Street, Pimlico, S.W.
Wade, Mr. W., 174, Warwick Street, Pimlico, S.W.
Waite, Mr. J. H., Cawood, Yorks.
Wakefield, Mr. T., Church Parade, Hounslow.
Wakeham, Mr. C., Helston.
Walkden, Mr. J., Birkenhead.
Walker, Mr. B. W., 26, Clapham Road, S.W.
Walker, Mr. C., 180, Falkner Street, Liverpool.
Walker, Mr. C. W., 180, Falkner Street, Liverpool.
Walker, Mr. D. P., 125, New City Road, Glasgow.
Walker, Mr. J., Manchester Road, Bradford, Yorkshire.
Walker, Mr. J., 124, High Street, Tewkesbury.
Walker, Mr. W., Broad Street, Bath.
Wallwork, Mr. J., Tyldesley, near Manchester.
Walpole, Mr. W., White Lion Road, Yarmouth.
Walsh, Mr. E., 209, York Street, Cheetham, Manchester.
Walton, Mr. R., 286, High Street, Exeter.
Walton, Mr. B. B., Lichfield.
Ward, G., F.C.S., Mechanics' Institution, Leeds.
Ward, Mr. W., Berwick-on-Tweed.
Ward, Mr. W. B., 8, High Street, Little Lever, Bolton.
Warhurst, Mr. W. T., 102, Great Horner Street, Liverpool.
Warneford, Mr. F., Queen's Road, Brighton.
Warner, Mr. C. H., 55, Fore Street, E.C.
Warner, Mr. G. T., 1, Mall, Clifton, near Bristol.
Warrand, Mr. T., Old Brentford, Middlesex.
Warren, Mr. G., 16, Guilford Road, Brighton.
Warren, Mr. T. T. P. B., F.E.S., Tamworth Ho., Mitcham Common, S.
Wastie, Mr. F. W., 183, Lower Kennington Lane, S.E.
Waterall, Mr. G. E., Nottingham.
Waterhouse, Mr. J., Ashton-under-Lyne.
Waters, Mr. W., High Street, Rye.

Watkinson, Mr. J. W., Kearsley, Farnworth, Bolton.
Watson, Mr. D., Park Crescent, Torquay.
Watson, Mr. G. P., Lower King Street, Norwich.
Watson, Mr. J., Rose Lane, Norwich.
Watson, Mr. T. D., 18A, Basinghall Street, E.C.
Watson, Mr. T. E., 75, Clayton Street, Newcastle-on-Tyne.
Watts, Mr. W., 10, Bedford Terrace, Kensington, W.
Watts, Mr. E. P., Dorchester, Dorset.
Watts, J., D.Sc., 57, Baker Street, W.
Waugh, Mr. A., 177, Regent Street, W.
Waugh, Mr. G., 177, Regent Street, W.
Wearing, Mr. W., Lancaster.
Webb, Mr. E. A., 60, Bartholomew Close, E.C.
Webster, Mr. S. M., 33, Bridge Street, Warrington.
Webster, Mr. G., Church Street, St. Helen's.
Welbury, Mr. S., Bridge Gate, East Retford.
Wellington, Mr. J. M., Oakham, Rutland.
Welsh, Mr. T., 29, Mosley Street, Newcastle-on-Tyne.
West, Mr. E. T., 17, Strand, Dawlish.
West, Mr. J., Stretford.
West, Mr. J., Torquay.
Westrup, Mr. J., 76, Kensington Park Road, W.
Westwood, Mr. W. B., 16, Newgate Street, E.C.
Westwood, Mr. A., Dudley Street, Brierley Hill.
Weston, Mr. G., 12, High Street, Guildford.
Weston, Mr. T. J., 151, Westbourne Terrace, W.
Wheaton, Mr. W. F., Ringwood, Hants.
Wheeldon, Mr. I., 217, Stockport Road, Manchester.
Wheeler, Mr. A. A., Sullivan's Quay, Cork.
Wheeler, Mr. J., Chipping Sodbury.
Whincup, Mr. W., 404, Essex Road, Islington, N.
Whitburn, Mr. A. R., 174, Regent Street, W.
White, Mr. E. A., Mayfield, Hawkurst.
White, Mr. F., London Road, Nottingham.
White, Mr. J., 20, Paterson Street, Glasgow.
Whitfield, Mr. H., Worcester.
Whitfield, J., F.C.S., 18, Westbro', Scarborough.
Whitla, Mr. J., Monaghan, Ireland.
Whittle, Mr. S., Leigh, Lancashire.
Whittles, Mr. H., Wheeler Street, Lozells, Birmingham.
Whittaker, Mr. W., Runcorn.
Whitworth, Mr. J., Littleboro, near Manchester.
Whyte, Mr. W., 554, St. Vincent Street, Glasgow.
Wiggin, Mr. J., 34, St. Matthew's, Ipswich.
Wild, Mr. J., Clarendon Place, Hyde, Cheshire.
Wilday, Mr. G. E., Market Place, Bicester, Oxon.
Wilkinson, Mr. G., 267, Waterloo Road, Manchester.
Wilkinson, Mr. W., 114, Lambeth Walk, S.E.
Wilkinson, Mr. W., Church Street, Colne.
Wilkinson, Mr. W., 263, Cheetham Hill, Manchester.
Williams, Mr. C. H., 25, King Street, Carmarthen.
Williams, Mr. C. J., St. John's, Warwick.
Williams, Mr. D. P., Llanberis, Carnarvon.
Williams, Mr. G. L., Burnham, Bridgewater.
Williams, Mr. H. W., Barmouth.
Williams, J., F.C.S., 5, New Cavendish Street, W.
Williams, Mr. J. E., The Eastgate, Chester.
Williams, Mr. J. J., 13, Desburgh Place, Harrow Road, Paddington, W.
Williams, Mr. P., 21, West Street, Horsham.
Williams, Mr. R., 2, Gresham Place, East Brixton, S.W.

Williams, Mr. R. Wyn, Dolgelly.
Williams, Mr. W. H., 13, Upper Baker Street, W.
Williams, Mr. W. P., Long Row, Nottingham.
Williams, Mr. W., 29, Red Lion Square, W.C.
Williams, Mr. W., 265, Crown Street, Liverpool.
Williamson, Mr. D., Stoke Terrace, Guilford.
Williamson, Mr. T. U., (Mr. Hind's,) Coventry.
Willis, Mr. B. W., 11, Farfield, Kidderminster.
Willis, Mr., King's Lynn, Norfolk.
Wilmer, Mr. J. G., 13, Bridge Street, Hull.
Willmott, Mr. W., King's College Hospital, W.C.
Willmott, Mr. W., 83, High Street, Borough, S.E.
Willsher, Mr. S., Tenterden.
Wilson, Mr. E., The Moor, Sheffield.
Wilson, Mr. E. W., 191, Lord Street, Southport.
Wilson, Mr. J., 35, High Street, Perth.
Wilson, Mr. W., 21, High Street, Hanley, Staffordshire.
Wilson, Mr. J. W., 3, Bootham, York.
Wilson, Mr. R., Clay Cross, Chesterfield.
Wilt, Mr. H. H., Prescott Road, Old Swan, Liverpool.
Wing, Mr. T., Melton Mowbray.
Witherington, Mr. T., 7, Foregate Street, Worcester.
Wolferstan, Mr. G. D., Midhurst, Sussex.
Woodcock, Mr. J., 177, Scotland Road, Liverpool.
Wood, Mr. A., New Brentford, Middlesex,
Wood, Mr. C. H., 25, Devonshire Road, Holloway, N.
Wood, Mr. E., 49, Berners Street, W.
Wood, Mr. E. B., Holloway Head, Birmingham.
Wood, Mr. J., New Street, Barnsley.
Wood, Mr. W. A., 41, Church Street, Hunslet.
Woodhead, Mr. J. T., 29, Paradise Street, Liverpool.
Woodstock, Mr. C. Woburn, Bedfordshire.
Woodward, Mr. J. L., Bridgewater.
Woodward, Mr. W., Chapter Bar, Nottingham.
Woolley, Mr. G., Manchester.
Wooley, Mr. H., 69, Market Street, Manchester.
Wootton, Mr. A. C., 44A, Cannon Street, E.C.
Worfolk, Mr. F., 57, Bridge Street, Bolton.
Worts, Mr. A., Harwich,
Wovenden, Mr. H., Sale, Manchester.
Wright, Mr. G., 297, Congreve Street, Birmingham.
Wright, Mr. J., Chesterfield.
Wright, Mr. J., 165, King Street, Yarmouth.
Wright, Mr. W. C., 55, Great Scotland Road, Liverpool.
Wright, Mr. W. V., Southwark Street, S.E.
Wyatt, Mr. H., 12, Derby Road, Bootle, Liverpool.
Wyles, Mr. B., Bourne.
Wynn, Mr. F., Horsforth, near Leeds.

Yarde, Mr. G., 60, Lamb's Conduit Street, W.C.
Yeates, Mr. T. F., 68, Market Street, Manchester.
Yewdall, Mr. E., Wade Lane, Leeds.
Young, Mr. J., Folds Road, Bolton.
Young, Mr. J. C., Warrington.
Young, Mr. J. R., 17, North Bridge, Edinburgh.
Young, Mr. R. F., New Barnet, N.
Young, Mr. W., 8, Neeld Terrace, Harrow Road, W.
Young, Mr. W. F., High Street, Salisbury.
Young, P., F.R.C.S., 28, Ann Street, Dundee.
Young, Mr. H. T., Thorne.

BRITISH PHARMACEUTICAL CONFERENCE. 1869-70.

ALPHABETICAL LIST OF TOWNS AT WHICH MEMBERS RESIDE.

The names to which an asterisk is attached are those of Local Secretaries.
For Alphabetical List of Names, see page 303.

Aberystwith.
Davies, J. T.

Accrington.
Astin, E.

Alfreton.
Robinson, J. S.

Alnwick.
Newbigen, J. S.

Alston.
Thompson, G.

Ampthill.
Brown, J.

Arbroath.
Burns, D. H.

Ashford, Kent.
Ingall, J.

Ashton-under-Lyne.
*Bostock, W.
Fisher, E.
Waterhouse, J.

Attleborough.
Clowes, W. C.

Axminster.
Gunn, F. J.

Aylesbury.
Turner, J.

Aylsham.
Nicholson, G. D.
Nicholson, S.

Bacup.
Mace, J.

Banbury.
Ball, G. V.

Barmouth.
Williams, H.

Barnstaple.
Curtis, W.

Barnsby.
Iberson, J.

Barnsley.
Ellison, J. B.
Wood, J.

Basingstoke.
Sapp, A.

Bath.
Barnitt, F.
Brooke, C.
Commans, R. D.
Dudden, R. M.
Dutton, C.
Ekin, C.
Hill, T.
Harding, R.
Lear, W. M.
Marsh, J. H.
Merrikin, J.
*Pooley, J. C.
Quarrington, W. B.
Tylee, J. P.
Walker, W.

Bawtry.
Jackson, F. M. J.

Beckenham, Kent.
Day, T. S.

Bedford.
Antony, J. S.

Besborough near Cork.
Cooke, J.

Beeston.
Faull, E.

Berwick-on-Tweed.
Ward, W.

Bewdley.
Newman, W. F.

Bicester.
Sandeland, R. B.
Wilday, G. E.

Bickley, Kent.
Garle, J.

Bideford.
Dingle, E.
Griffiths, T.

Bilston.
Gray, C.
Kearnes, R. H.

Birkenhead.
Ambler, T.
Ball, J.
Bennett, H.
Dickenson, J.
*Dutton, J.
Fawcett, J.
Foulkes, W. J.
Jones, C.
King, J.

Mullock, R.
Nicholson, H.
Pattison, R.
Shaw, R.
Symes, C.
Walkden, J.

Birmingham.
Arblaster, C. J.
Atkins, W. S.
Barclay, T.
Clayton, F. C.
Dewson, S.
Dunmore, J.
*Dymond, G.
Foster, J. A.
Goodwin, J.
Grady, F.
Grieves, A. S.
Holdsworth, T. W.
Jones, W. J.
Lucas, J.
Morgan, W. J.
Musson, T. J.
Price, H.
Simmonds, A.
Smith, A.
Snape, E.
Southall, A.
Southall, W.
Tomlinson, G. D.
Whittles, H.
Wood, E. B.
Wright, G.

Bishop Auckland.
Harburn, R. H.

Bishop's Castle.
Owen, J.

Blackburn.
Booth, J.
Farnworth, W.

Blackpool.
Sharples, G. W.

Blairgowrie.
Crerar, J.
Grant, W.

Blandford.
Groves, W. E.

Bognor.
Long, A.

Bolton, Lancashire.
Blain, W.
Cunliffe, J.
Cunliffe, N.
Dearden, W.
Dutton, F.
Fisher, W.
Griffin, G. E.
Grisdale, T.
Hamer, J.
Hampson, P.
*Harwood, E. G.
Heap, R.
Knott, R.
Leather, W.
Morris, T.
Oldham, P.
Pownall, T. R.
Priestley, J.
Richardson, J.
Stronge, R.
Taylor, W.
Ward, W. B.
Watkinson, J. W.
Worfolk, F.
Young, J.

Boston.
*Marshall, R.
Pilley, S.
Queenboro, J.

Boston Spa.
Gill, H.

Bourne.
*Mills, R. M.
Roberts, J. B.
Wyles, B.

Bournemouth.
Mason, J.

Bradford-on-Avon.
Saunders, S. P.

Bradford, Yorkshire.
Beanland, S.
Bell, F.
Boast, J.
Harrison, T.
Henderson, C.
Hick, J.
Lister, S.
Metcalfe, A. A.
Newsholme, W.
*Parkinson, R.
Pullan, T.
Rimmington, F. M.
Rogerson, M.
Silson, R. W.
Stead, T.
Walker, J.

Brentford, Essex.
Guest, E. P.

Brentford (New), Middlesex.
Wood, A.

Brentford (Old), Middlesex.
Warrand, T.

Bridge, Kent.
Thomas, J.
Welberry, G.

Bridgewater.
Williams, G. L.
Woodward, J. L.

Bridport.
Beach, J. W.

Brierley Hill.
Voce, W. G.
Westwood, A.

Brighton.
Aldridge, J.
Armitage, E. H.
Barton, H.
Blacklock, J. D.
Bradley, J. D.
Brew, T. A.
Colby, J., sen.
Cornish, W.
Dowsett, A.
Edwards, J.
Field, J.
Gardner, J. T.
Glaisyer, T.
Gwatkin, J. T.
Harris, E. R.
Kemp, J.
Long, —
Matthews, J.
Merrett, —
Noakes, R.
Padwick, T.
Phillips, J.
Salmon, —
*Savage, W. D.
Schweitzer, J.
Smith, W.
Steavens, G.
Warneford, F.
Warren, G.

Brill.
Holmes, F. G.

Bristol.
Boucher, J.
Bourne, C.
Bush, T.
Hatch, R. M.
Jones, E. H.
Kent, —
Martin, F. R.
Pitman, J.
Sprackett, G.
Stevens, F.
*Stoddart, W. W.
Townsend, C.

Bromsgrove.
Haines, J. J.

Bromwich, West.
*Birch, W.
Green, J.
Holliday, T.
Penhouse, E.
Roberts, G.

Burnley.
Crawshaw, E.

Bury St. Edmunds.
*Floyd, T.
Gross, W.
Hardwicke, E. J.
Jenner, C. S.

Burslem.
*Blackshaw, S.
Guest, G. C.
Leicester, T.
Oldham, W.

Buxton.
Ball, E.

Caistor, Lincolnshire.
Levick, G. A.

Cambridge.
Church, H. J.
Deck, A.
Sussum, F.

Canterbury.
Amos, D.
Goulden, E. B.
Harvey, S.

Cardiff.
Joy, F. W.

Carlisle.
Daniel, J.
Fisher, J. J.
Gibson, C.
Hallaway, J.
Harrison, J. P.
Moss, J.
*Moss, W.
Slack, J.
Sowerby, J.
Thompson, A.
Todd, J.

Carmarthen.
Williams, C. H.

Castleford.
Farrer, C.

Chatteris.
Langman, P.

Cheltenham.
Balcombe, J.
*Barron, W.
Finch, J.
Horsley, J.

Chertsey.
Boyce, G.

Chester.
Baxter, G.
Evans, J. H.
Higgins, W.
Hodges, W.
Jones, R.
Mills, J.
*Shepheard, T.
Williams, J. E.

Chesterfield.
Wilson, R.
Wright, J.

Chester-le-Street.
Robinson, J.

Chorley.
Aslin, —
Moss, J.

Chudleigh.
Cleave, W.

Cinderford, Gloucestershire.
Cordwin, W.

Cirencester.
Smith, C. S.

Clayton-le-Moors.
Johnson, M.

Cleckheaton.
Knowles, H. W.

Cleobury-Mortimer.
Evans, E. P.

Clifton, near Bristol.
Cooper, J. N.
Giles, R. W.
Mortimer, J.
*Schacht, G. F.
Warner, G. F.

Cockermouth.
Straughton, J.

Codnor.
Farnsworth, T.

Colbridge-on-Tyne.
Stanthorpe, W.

Colchester.
Chaplin, J. R.
Prosser, E. T.

Coldstream, N. B.
Dodds, N.

Collumpton.
Foster, J.

Colne.
Asgnith, W. C.
Wilkinson, W.

Coltishall, Norfolk.
Smith, W. L.

Colyton.
Bartlett, H., junr.
Rogers, W. H.

Cork.
Richardson, J. H.
Tomlinson, W.
Wheeler, A. A.

Coventry.
Bailey, T.
Hinds, J.
Hinds, W.
Hodgkinson, G.

*Powers, E.
Williamson, J. F.

Cowood.
Waite, J. H.

Cradley Heath.
Nock, J.

Crediton.
Jackson, W.

Crew.
Phillips, J.

Crewkerne.
Harris, M. C. J.
Pearce, J.

Crickhowell.
Christopher, W.

Darlington.
Badcock, J.
Robinson, A. F.
Robson, J. C.
*Swenden, J.

Dartmouth.
Cutcliffe, G. F.

Darwen, Lancs.
Grime, T.
Shorrock, R.

Dawlish.
Kay, R.
West, E. T.

Deal.
Clarabut, J.

Derby.
*Frost, G.
Hart, C. D.
Ritchie, J. M.

Devizes.
Kent, F. W.

Devonport.
Radford, J. C.
Bray, R.

Dewsbury.
*Craven, F.
Fox, G.
Robinson, J. R.

Diss.
Cupiss, F.
*Gostling, T. P.
Thrower, E. A.

Dolgelly.
Morris, E.
Williams, R. W.

Doncaster.
Howorth, J.
Shaw, H. W.
Stiles, W. H.

Dorchester.
Watts, E. P.

Dover.
*Bottle, A.
Bolton, J.
Brown, J. F.
Cottrill, W. H.
Forster, —
Hambrook, J. B.
Peake, H.
Thompson, E.

Driffield.
Sterriker, J.

Droitwich.
Taylor, E.

Drury Hill, Notts.
Jackson, R.

Dublin.
Draper, H. N.
Postans, A. P.
*Tichborne, C. R. C.

Dudley.
*Dennison, M.
Dunn, E.
Gare, C. H.
Perry, G. E.

Dukenfield.
Avison, J.

Dundee.
Anderson, A. B.
Doig, W.
Ferrier, D. H.
Hardie, J.
Henderson, W. P.
*Hodge, J.
Jack, G.
Kerr, C.
Laird, W.
Mackay, G. B.
Miller, T. S.
Munro, G.
Park, W.
Russell, D.
Sandeman, P.
Young, P.

Dunkeld.
M'Donald, K.

Dunstable.
Staffell, H.

Duntocher.
Stanford, E. C. C.

Durham.
*Burden, J.
Ferrero, A. P.
Lambert, J.
Leighton, J. H.
Longbottom, J.
Sarsfield, W.

Ealing, Middlesex.
Hayles, B. H.

Easingwold.
Rookledge, J.

Eastbourne.
Hall, S.

East Dereham.
Lenton, W. H.

East Grinstead.
Tully, J. Senr.

Eastwood.
Ault, J.

Edinburgh.
Ainslie, W.
Aitkin, W.
Baildon, H. C.
Blanshard, G.
Brown, D.
Brown, D. R.
Buchanan, J.
Gardner, J.
Levie, A. M.
Macadam, S.
*Mackay, J.
Nesbit, J.
Nicol, J.
Raimes, R.
Simpson —
Smith, T.

Tait, W.
Young, J. R.

Esher.
Ling, E.

Exeter.
Batting. T. G.
Bevans, J.
Broom, W.
Butland, C.
Cooper, S.
Dowling, R.
Evans, A.
*Husband, M.
Knapman, J.
Lake, J. H.
Napier, G. L.
Palk, J.
Tanner, N. W.
Tighe, H. W.
Walton, R.

Exmouth.
Teed, D.
Thornton, T.

Eye.
Nurse, W. S.

Falmouth.
Newman, W. F.

Gateshead.
Elliot, R.

Gisborough, Yorks.
Duck, W. B.

Glasgow.
Black, J.
Brown, T.
Currie, J.
Currie, J.
Davison, T.
Dun, R.
Fairlie, J. M.
Frazer, D.
Fleming, J.
Greig, W.
Guthrie, P.
Halley, A.
Hamilton, J.
Harrower, P.
Jaap, J.
Johnson, A. E.
Kennedy, W.
*Kinninmont, A.
M'Donald, J.
M'Gregor, —
M'Millan J. M.
Mitchell, J.
Moffat, T.
Murdock, G.
Maccall, R. M.
Rose, A.
Simpson, J. W.
Sinclair, G.
Walker, D. P.
White, J.
Whyte, W.

Glastonbury.
Mayhew, T.
Mayhew, J.

Gloucester.
Meadows, H.
Pearse, T.

Goole.
Hasselby, T. J.
Squire, W.

Gosport.
Mumby, C.
Strachan, J. J.

Gourock.
Barr, R.

Grantham.
Hopkinson, T.

Grasmere.
Bell, J.

Gravesend.
Drury, G. S.
Stevens, A. J.

Great Driffield.
Ross, L. B.

Great Malvern.
Francis, G.
Proctor, S. J.

Great Yarmouth.
Bell, W.
Blanchflower, J.
Bond, J.
Owles, J.
*Owles, J. J.
Poll, W. S.
Silvers, G.
Skoulding, G. F. S.
Steward, A.
Thurlby, G.
Walpole, W.
Wright, J.

Grimsby.
Colton, T.
Gossop, G. K.

Guildford.
Weston, G.
Williamson, D.

Hadleigh.
Paine, J. H.

Halifax.
Brooke, W.
*Dyer, W.
Farr, J.
Hebden, W. C.
Jessop, J.
Sutcliffe, R.

Hanley, Stafford.
Wilson, W.

Harleston.
Muskett, J.

Harrogate.
Allanson, C.
*Coupland, J.
Davis, R. H.
Taylor, J. H.

Harwich.
Worts, A.

Haslingden, Lancashire.
Blayney, J. J.

Hastings.
Davies, J. M.
Keyworth, J. A.
Robinson, J. S.
Rossiter, F.
Snowden, R.
Todd, R. P.

Hawkhurst.
White, E. A.

Heckmondwike.
Booth, J.
Holt, H.

Helshon.
Wakeham, C.

Hemstead.
Mood, W. A.

Henley-on-Thames.
Soames, W.

Hereford.
Seward, W.
Steward, W. A.

Hertford.
Adams, G.
Seward, W.

Hexham.
Bell, G.
Riddel, W. R.
*Smith, J. S. T. W.

Heywood.
Jackson, J.

High Wycombe.
Bloye, H.
Loveland, C.

Hindley.
Slingsby, S.

Hinkley.
Gilbert, G.
Pridmore, T.

Hirwain.
Sims, J.

Hitchin.
Ransom, W.

Holbeach.
Curtiss, T. W.

Holmfirth.
Knowles, W. H. H.

Honiton.
Turner, G.

Horncastle.
Carlton, E. P.

Horsforth, near Leeds.
Wynn, F.

Horsham.
Williams, P.

Houghton-le-Spring.
Hedley, J.

Hounslow.
Stone, J.
Wakefield, T.

Howden.
Saville, J.

Hoxton.
Hodsoll, T. W. H.

Huddersfield.
Crispin, W.
Kaye, H.

Hull.
Anholm, A.
Baynes, J.
*Bell, C. B.
Burn, J.
Gibson, C. P.
Hall, H. R. F.
Metcalfe, C. L.
Milner, J. G.
Smith, T. J.
Staning, W.
Wilmer, J. G.

Hungerford, Berks.
Taylor, W. G.

Huntingdon.
Provost, J. P.

Hyde, Cheshire.
Wild, J.

Ilchester.
Barrett, T. S.

Ilkeston.
Potts, R. S.

Ipswich.
Anness, S. R.
Callaway, L.
Cornell, W.
Eyre, A. B.
Lyon, R.
Marchant, C. F.
*Wiggin, J.

Ironville.
Greaves, A.
Greaves, W. S.

Isleham.
Diver, R.

Isle of Wight.
Brown, G.
Millidge, W. H.

Jersey.
Le Feuvre, F.

Kendal.
Bateson, T.
Coulter, G. (Sedbergh)
Hinds, W. L.
*Severs, J.
Magnall, W.

Kenilworth.
Barton, H.

Keswick.
Harrison, J.
Henderson, M. J.

Kettering.
Hitchman, H.

Kidderminster.
Willis, W. B.

Kingsbridge, Devon.
Trake, W. H.

King's Lynn, *see* Lynn.

Kingston-on-Thames.
Gould, F.
Tamplin, E. C.

Kington, Hereford.
Stanway, W. H.

Kirkaldy.
Storrar, D.

Kirriemuir.
Ford, J.

Knaresboro.
Sindall, J. W.
Thompson, J.

Knutsford.
Silvester, H. T.

Lancaster.
Bagnall, W. A.
Wearing, W.

Landport.
Ball, W.
Stanswood, J.

Leamington.
Barnitt, J.

Caswell, E.
Cutting, J.
Davis, H.
*Jones, S. U.
Judd, W.
Orton, T. J.
Pullin, W. H.
Smith, —
Uppleby, H.

Ledbury, Hereford.
Freeman, T. W.

Leeds.
Abbott, J.
Archer, J. S.
Atkinson, R. M.
Brown, E.
Clapham, J.
Cragg, J.
Ebdell, J. T.
Exley, G.
Fawthorpe, J.
Handcock, J.
Hardman, J. W.
Harvey, T.
Holmes, J.
Horsfield, J. N.
Iredale, T.
Pierson, C.
*Reynolds, R.
Smeeton, W.
Stead, B.
Steele, E. B.
Taylor, B.
Taylor, S.
Ward, G.
Wood, W. A. (Hunslet)
Yewdall, E.

Leek, Staffordshire.
Johnson, W.

Leicester.
Berridge A.
Buzzard, T. H.
Carr, W.
Clark, J. W.
Cooper, T.
Goddard, J.
Merryweather, C.
Parsons, F.
*Richardson, J. G. F.
Salisbury, W. B.
Toone, J. H.

Leigh.
Whittle, J.

Leith.
Finlayson, T.

Leominster.
Davis, D.
Ellwood, M. J.
Orren, S.

Lewes.
Curtis, H.
Saxby, H. jun.

Lichfield.
Walton, B. B.

Lieston, Suffolk.
Gooch, T.

Lincoln.
*Hayward, C.
Maltby, —
Turner, J.
Peppercorn, B.

Little Bolton.
See BOLTON.

Liverpool.
*Abraham, J.
Agnew, G.
Alpass, H. L.
Barber, G.
Barton, F.
Barton, A. F. G.
Blood, C.
Blyton, J.
Buck, J. M.
Buck, R. C.
Clark, J.
Cohen, S. N.
Cohen, B. D.
Davies, E.
Delf, T.
Dickens, B.
Drew, S.
Driver, T.
Evans, E.
Evans, E., jun.
Evans, J. J.
Evans, J. R.
Ferguson, J.
Frazer, —
Frazer, A.
Furniss, T.
Graham, H.
Greenall, A.
Hall, J.
Hargraves, J.
Heidfield, D.
Hilditch, S. G.
Hingston, A. H.
Hocken, J.
Horton, A.
Horton, A. T.
Humphries, C.
Hurstwick, T. H.
Johnson, J. H.
Johnson, M. (Huyton).
Jones, F.
Jones, W.
Lake, W. P.
Lee, S. W.
Livsey, A. E.
Luke, W.
Lumby, A.
Martin, T.
Mason, A. H.
Parkinson, R.
Redford, A.
Redford, G. A.
Robinson, H.
Robinson, J. F.
Samuel, A. H.
Shaw, J.
Sharp, C.
Shields, J.
Steggs, G. R.
Sumner, R.
Sumner, R. M.
Tanner, A.
Tate, A. N.
Taylor, F.
Troughton, C.
Turner, A.
Turner, J. A.
Utley, A.
Walker, C. W.
Walker, W.
Warhurst, W. T.
Williams, W.
Wilt, H. H.
Woodcock, J.
Woodhead, J. T.
Wright, W. C.
Wyatt, H.

Llanberis.
Williams, D. P.

London, E.
Bateman, T. H. M.
Bishop, A.
Chapman, S. S.
Clark, J. A.
Dean, S.
Eastman, J. E.
Edwards, E.
Fitch, R. O.
Fox, W.
Gardiner, —
Goodchild, —
Goodwin, J.
Hall, T. H.
Howard, D.

Howard, W. D.
Jones, J. H.
Kernot, G. C.
Loane, J.
Perrot, J.
Stevens, D. P.
Tyrer, P.

London, E.C.
Balmer, J.
Bass, J.
Brough, J. C.
Charity, W.
Coleman, A.
Constance, E.
Darby, S.
Davison, A.
Dodwell, J.
Evans, H. S.
Flux, W.
Francis, G. B.
Froom, W. F.
Gething, W. B.
Gilbertson, H.
Good, T.
Hanbury, D.
Hanbury, D. B.
Harvey, E.
Heathfield, W. E.
Herring, H.
Hill, A. B.
Hill, W.
Howden, R.
Hughes, L. S.
Johnson, J. G.
Jones, J. H.
Knight, J.
Linford, J. S.
Marston, T. J.
Maw, C.
Pattison, G.
Pedler, A.
Penrose, A. P.
Sands, J.
Schacht, J.
Simmonds, P. L.
Squire, W.
Stable, R. H.
Taylor, T.
Tidman, W.
Umney, C.
Wainer, C. H.
Warner, C. H.
Watson, T. D.
Webb, E. A.
Westwood, W. B.
Wootton, A. C.

London, N.
Allchin, A.
Applegate, E.
Bastin, E.
Bently, W. J.
Boor, G.
Clapp, E. F.
Cole, F.
Cruse, J. C.
D'Aubney, T.
Davison, A.
Eastman, J. E.
Gooch, W. P.
Hanley, C.
Hodsoll, T. W. F.
Knight, J.
Lance, W. N. G.
Large, J. H.
Lees, —
Lincuss, W. W.
Merrell, J.
New, W. W.
Owen, J.
Skipper, E.
Stevens, P. A.
Tipping, H. J. W.
Whincup, W.
Wood, C. H.
Young, R. F.

London, N.E.
Burton, J.
Gadd, H.
Grainger, E. J.

London, N.W.
Bell, W. H.
Betty, S. C.
Braithwaite, J. C.
Collins, J. R.
Dunmore, G. H.
Giles, G. J.
Greenish, T. E.
Greenish, T.
Henty, H. M.
Johnson, J.
Large, J. H.
Morris, G.
Sangster, A.
Stansfield, R.
Taylor, G. S.
Tuson, R. V.

London. S.
Crisp, F. A.
Martin, N. H.
Norrish, J.
Pass, H.
Readwin, T. A.
Roberts, A. J.
Robertson, F. F. L.
Smith, W. F.
Tibbs, F.
Warren, T. T. P. B.
Walker, B. W.

London, S.E.
Baldock, J. H.
Ball, G.
Biffin, T.
Brown, A.
Chick, W.
Childs, W.
Clift, E.
Crow, E. L.
Earland, W.
Freeman, R.
Flood, —
Grisbrook, S.
Hall, —
Holloway, T.
Howell, M.
Jones, T.
Lockyer, G.
Long, W.
Moody, J.
Orpe, T.
Plummer, E.
Poingdestre, C. R.
Rabson, H.
Reed, C. W.
Silverlock, H.
Simpson, T.
Taylor, —
Truman, F. W.
Wastic, F. W.
Wilkinson, W.
Wilmott, W.
Wright, W. V.

London, S.W.
Arrow, J.
Ashford, H. S.
Ashton, W.
Barnes, J. B.
Bartlett, W.
Bicknell, W.
Bosley, J. L.
Bourdas, I.
Bourdas, I., jun.
Breton, H. W.
Cox, H.
Cromwell, O.
Curtis, T.
Deane, H.
Deane, J.
Dyer, A. J.
Faulkner, J. R.
Flower, T. S.
Gulliver, W.
Hall, W.
Hickey, E. L.

Hucklebridge, J. M.
Hunt, C.
Jefferson, T.
Jones, J. H.
King, H.
Newby, R. J.
Pasmore, J. F.
Quiller, C. R.
Rowe, R.
Sparrow, W. C. F.
Staples, C.
Sutcliffe, J.
Thomas, R. W.
Wade, J.
Wade, W.
Williams, R.

London, W.
Anderson, T. S.
Andrews, F.
Barker, W. R.
Barnard, J.
Beedzler, J.
Bell, W.
Beynon, E.
Billing, T.
Bird, A.
Blades, F.
Brownen, G.
Brownlow, —
Bullen, T.
Burden, E.
Carteighe, M.
Cawdell, G.
Coles, F.
Cooper, A.
Cooper, W. W.
Cottrill, J. W.
Cracknell, C.
Cripps, J.
Crotch, J.
Cryer, H.
De Putron, J.
Downes, D.
Dyson, W. B.
Gale, S.
Godfrey, H. E.
Haselden, A. F.
Hemingway, A.
Hemingway, E.
Hemingway, W.
Heppell, H.
Hickman, W.
Hills, T. H.
Hoffe, P.
Hopkin, W. K.
Horncastle, J.
Ince, J.
Jackson, C.
James, J. S.
Jessod, T. A.
Jewell, —
Keene, E.
Lawrence, H.
Long, H.
Matthews, W.
Maudsley, W.
Mellin, G.
Mitchell, M. F.
Newey, J. F.
Nurthen, F. R.
Nutt, A. J.
Pearson, E.
Potter, J.
Reynolds, J. J.
Richardson, G.
Robbins, J.
Rose, A.
Sandford, G. W.
Savory, J.
Savory, C. H.
Sharpe, G. Y.
Shephard, T. F.
Shirtliff, W.
Smith, W.
Starling, H. W.
Stevenson, W.
Taylor, J.
Titley, —
Trotman, A. C.
Twinberrow, J. K.
Verity, R.
Watts, H. W.
Watts, J.
Waugh, A.
Waugh, G.
Weston, T. J.
Westrupp, J.
Williams, J. J.
Williams, W. H.
Williams, J.
Witburn, A. W.
Wood, E.
Young, W.

London, W.C.
Akhurst, W. E.
Attfield, J.
Bentley, R.
Bird, W. L.
Bletsoe, J.
Brembridge, E.
Buckle, C. F.
Carter, F. P.
Collins, J.
Fewtrell, W. T.
Heaton, C. W.
Jacks, E.
Johnson, B. M.
Linder, C.
Martindale, W.
Matthews, H.
Moss, J.
M'Cullock, F.
Morson, T. N. R.
Morson, T.
Paul, B. H.
Redwood, T.
Sainsbury, E.
Sainsbury, S.
Salter, G.
Strawson, G. F.
Sutter, E.
Taubman, H. A.
Taubman, R.
Tilden, W. A.
Tupholme, J. T.
Williams, W.
Wilmott, W.
Yarde, G.

Loughborough.
Adams, J.

Louth.
Greenwood, J.
Simpson, H. D.

Ludlow.
Cocking, G.

Luton.
Mason, A.

Lydd.
Nowers, E.

Lymm, Cheshire.
Evans, J. H.
Henshall, J.

Lynn, Norfolk.
Allen, H. W.
*Atmore, G.
Cocker, J.
Pickrell, G.
Willis, —

Macclesfield.
*Bates, W. J.
Hodkinson, J.
Smallwood, J.

Maidenhead.
Thompson, C. H.

Maidstone.
Argles, —

Manchester.
Benger, F. B.

Botham, J.
Brown, J.
Brown, W. S.
Bushley, T.
Calvert, F. C.
Carson, R.
Carruthers, R. B.
Carter, W.
Darling, W. H.
Gibson, J.
Gill, S.
Goodwin, J.
Hardeman, —
*Halliday, W. J.
Hampson, R.
Hincliffe, F. G. U.
Hodgson, W.
Holland, E.
Hughes, C. J.
Johnson, T. S.
Leete, W. W.
Lewis, R. O.
Marsden, T. B.
Maunder, R.
Mather, W.
Metcalfe, W.
Mumbray, H. G.
Mitchell, J.
Nicholson, E.
Paine, S.
Peel, A.
Pratt, G. W.
Robinson, B.
Ryder, T. F.
Siebold, L.
Slegg, J. T.
Taylor, T. H.
Terry, T.
Wallwork, J.
Walsh, E.
Wheeldon, J.
Whitworth, J.
Wilkinson, G.
Wilkinson, W.
Wooley, J.
Woolley, H.
Wovenden, H.
Yeates, T. F.

Mansfield.
*Agar, W.
Jackson, W.
Oldham, J.

Market Rasen.
Casterton, J.

Marlow.
Seaman, J. S.

Marlborough.
Rowe, P. M.

Maryport.
Cockton, J.

Matlock-Bath.
Greaves, J.

Matlock Bridge.
Hodgkinson, J. S.

Melksham.
Barnes, J. C.

Melton-Mowbray.
Wing, T.

Mere, Wilts.
Bracher, E.

Merthyr.
Thomas, R.

Middlesboro-on-Tees.
Bell, F. R.
Taylor, H. H.

Middleton.
Roberts, J.

Midhurst.
Langridge, T. B.
Wolferston, G. D.

Mildenhall.
Chifney, G.

Monaghan.
Whitla, J.

Montrose.
Burrel, G.

Moreton-in-Marsh.
Scott, W. L.

Needham Market, Suffolk.
Harrington, A.

Newark.
Morris, A.

Newcastle-on-Tyne.
Arnison, W. C.
Beadel, A.
Bowman, H.
*Brady, A.
Brady, H. B.
Brocket, R. H.
Coates, J.
Crozier, W.
Frank, J. M.
Hall, T.
Hume, A.
Ismay, J. G.
Ismay, J.
Jobson, M.
Kirkup, T.
Marreco, A. F.
Owen, W.
Parker, M.
Potts, T.
Proctor, B. S.
Stark, J. S.
Swan, J.
Temperley, T.
Watson, T. E.
Welsh, D.

Newcastle-under-Lyme.
Cartwright, W.
Gould, J.

Newhaven.
Reeve, O. J.

Newmarket.
Rogers, A. R.

Newport Pagnell.
Taylor, T.

Newton Abbot.
Godfrey, F.
Green, W.
*Poulton, J.

Northallerton.
Fairburn, J.

Northampton.
*Bingley, J.
Clark, W. R.
Druce, G. C.
Mayger, W. D.
Negus, S.
Sandall, W.
Shipman, J.

North Shields.
See SHIELDS.

Northwich.
Clough, J.
Payne, J. B.

Norwich.
Arnold, E
Bird, W. S.
Butler, J. G.
Butler, W. J.
Caley, A. J.
Cooke, W.
Cossey, J.
Cubitt, G.
Fitch, R.
Gardiner, J.
Hall, A.
Peggs, J. O.
Robinson, J.
Row, G.
Searby, W.
Smith, F. D.
Smith, J. D.
Smith, R. B.
Stockings, A.
*Sutton, F.
Watson, G. V.
Watson, J.

Norwood.
Childs, W.

Nottingham.
*Atherton, J. H.
Bass, C.
Beardsley, —
Dann, —
Dennis, J. L.
Fitzhugh, R.
Guest, W.
Jackson, R.
Jenkins, J.
Jenkins, J. T.
Mayfield, J. T.
Merry, W.
Oakland, W.
Parker, S.
Parker, W. H.
Parr, S.
Patchitt, E. C.
Rayner, J.
Shepperley, J., jun.
Smith, W.
Waterall, G. E.
White, F.
Williams, W. P.
Woodward, W.

Oakham.
Wellington, J. M.

Old Cross, Hereford.
Durrant, G. R.

Oldham.
*Bagshaw, W.
Geddes, W.
Jackson, J. T.

Olney.
Fever, W.

Oswaldtwistle near Accrington.
Haworth, W.

Oxford.
Hitchcock, C. A.
Houghton, T.
Ince, Rev. W.
Patterson, W.
Taylor, R.
*Tuck, J.

Oxton, Birkenhead.
Ball, J.

Paignton.
Merson, —, jun.

Patricroft.
Bowden, W.

Penrith.
Kirkbride, W.
Redfern, T.

Perth.
Reid, N.
Wilson, J.

Peterboro.
Bright, R.

Plymouth.
*Balkwill, A. P.
Balkwill, G.
Burdwood. J.
Hearder, H. P.
Hetherington, A. H.
Lewin, W.
Luke, R. S.
Marks, B.
Turney, S. B.

Plymton St. Maurice, Devon.
Martin, J.

Poole.
Penney, W.

Portobello.
Kemp, D.

Prescott.
Slack, J. L.

Preston.
Daggers, F.
*Houghton, W.
Mason, H. C.

Princes Risboro, Bucks.
Ridley, H.

Ramsbottom.
Hedley, T.
Morton, S.

Ramsey.
Palmer, F. W.

Ramsgate.
Morton, H.

Rawtenstall, Lancs.
Halstead, A.

Reading.
Jameson, W. C.

Redditch.
Harris, J.

Redhill.
Padwick, T.

Rhyl.
Jones, E. P.

Richmond, Surrey.
Clarke, T. M.

Richmond, Yorks.
Thompson, J. T.
Thompson, T.

Ringwood.
Wheaton, W. F.

Rochdale.
Bamford, J. W.
*Booth, J.
Hadfield, J.
Robinson, R.

Rochester.
Herris, H. W.

Rothbury, Northumberland.
Farrage, R.

Rotherham.
Davy, H.
Greaves, E. (Mexbro')

Rothwell.
Ginns, A. B.

Roydon, Herts.
Bull, B.
Stone, C.

Royston.
Swinn, C.

Rugeley.
Greensmith, S.

Runcorn.
Whittaker, W.

Ruthin.
Bancroft, J. J.

Rye.
Plomley, —
Waters, W.

Saffron-Walden.
Gilling, J.

Sale, Cheshire.
Hebb, T.

Saint Albans.
Lewis, H.

Saint Austell, Cornwall.
Geldard, J.

Saint Day, Cornwall.
Corfield, T. J. T.

Saint Helen's, Lancashire.
Colton, F.
*Cotton, J.
Hibbert, J.
Webster, G.

Salisbury.
*Atkins, S. R.
Bennett, T.
Orchard, E. J.
Read, J.
Young, W. F.

Salop.
Bates, J.
Phillips, J.

Sandback, Cheshire.
Gee, G.

Scarborough.
Bland, H.
Oldfield, F.
Smart, J.
*Whitfield, J.

Selby.
Brooks, J. I.
*Colton, T.
Cutting, S. F.
Cutting, T. J.

Shaldon, near Teignmouth.
Rogers, S.

Sheerness.
Bray, J.

Sheffield.
Bennett, G.
Clayton, W.
Cubley, G. A.
Dobb, J. T.
Ellinor, G.
Eyre, S.
Gowland, G. R.
Gowland, W.
Harrison, G. N.
Hill, J.
Horncastle H.
Jenkinson, J. H. D.
Leslie, J. B.
Maleham, H. W.
Preston, J.
*Radley, W. V.
Spavould, E.
Wilson, E.

Shepton Mallett.
Cottrill, G. J.
Fudge, C. W.

Sherbourne, Yorks.
Dove, J.

Shields (North).
Roddam, H. R.

Shields (South).
Mays, R. J. J.
Noble, J.

Shoeburyness.
Coope, W.

Shrewsbury.
Goucher, J.
Phillips, T.

Sidmouth.
Chessall, R.

Sittingbourne.
Gordelier, P. W. G.

Sleaford.
Heald, B.

Slough.
Dawson, W.

Sodbury.
Freeman, J. F.

Soham.
Floyd, J.

Southampton.
Adams, A. A.
Bienvenu, J.
Dalgarno, P.
Dawson, O. R.
Manby, G.
*Randall, W. B.
Spearing, J.

Southport.
*Ashton, W.
Kershaw, J.
Monkhouse, J.
Wilson, E. W.

Southsea.
*Rastwick, J.
Rogers, W. S.
Sapp, J. J.

Sowerby Bridge, Yorks.
Stott, W.

Spilsby.
Rainey, E.

Staincross, near Barnsley.
Holden, A. H.

Staines.
Earee, T.

Stamford.
Dalton, J. R.

Stockport,
Clark, T.

Stockton-on-Tees.
*Brayshay, T.
Brayshay, W. B.
Knights, J. A.

Stoke-on-Trent.
Adams, F.
*Adams, J. H.
Fletcher, T.
Hitch, T.

Stokesbury, Yorks.
Calvert, R.

Stone, Staffordshire.
Slater, T.

Stourbridge.
Bland, J. A.
Jones, R. G.

Stoneycroft.
Parker, J. E.

Stowmarket.
Simpson, A. L.
Sutton, C. W.

Stow-on-the-Wold.
Thornley, E.

Stratford-on-Avon.
Kendall, F.

Stretford
West, J.

Stroud.
Coley, S.
*Pearce, J. A.
Smith, D.

Sudbury.
Harding, J. J.
Wheeler, J.

Sunderland.
Craig, C.
Harrison, W. B.
*Sharpe, D. B.

Sutton Ashfield.
Littlefield, S.

Sutton Coldfield.
Smith, W.

Swaffham.
Baker, P. C.

Tamworth.
Morgan, G.

Taunton.
Evans, J. J.
Gregory, G. H.
Hambley, C. J.
Lindsey, F. C.
Pearse, J.
*Prince, H.

Teignmouth.
Cornelius, R. B.
Carpenter, J. T.

Tenterden.
Willsher, S.

Tetbury.
Blewett, W. R.

Tewkesbury.
*Allis, F.
Walker, J.

Thirsk.
Manfield, W.
Thompson, W. M.

Thorne near Doncaster.
Knowles, C. W.
Young, H. T.

Thrapstone.
Pars, R. C.

Tickhill, Yorks.
Colbeck, —

Tipton.
Butler, J., jun.

Todmorden.
Buckley, R.
Lord, C.

Torquay.
Brown, E. W.
Clarke, R. F.
Cocks, J. W.
Glanfield, G.
Guyer, J. B.
Hartt, C.
*Hearder, W.
Millar, F. C. M.
Narracott, H.
Riches, T.
Smith, E.
Watson, D.
West, J.

Torrington.
Handford, E.

Totnes.
Seccombe, F.

Trimpley.
Steward, J.

Tring, Herts.
Jeffrey, G.

Trowbridge.
Hayward, W. H.
Stevens, J. A.

Tunbridge Wells.
Arnold, S.
*Cheverton, G.
Nicholson, A.
Panes, G.
Sells, R. J.

Twickenham.
Shelley, H.

Ulverston.
Downward, J.
Mackereth, H. W.

Uppington.
Hope, W.

Uttoxeter.
Johnson, J. B.

Wadebridge, Cornwall.
Grose, N. M.

Wainfleet.
Huggins, H.

Wakefield.
Carr, J.
*Gissing, T. W.
Job, C. F.
Romans, T. W.

Waley, Great, Essex.
Hayes, J.

Wallingford.
Payne, S.
Upton, J.

Walmer, Kent.
Peake, R.

Walsall.
Bayley, J. T.
Bennet, J. H.

Hobson, H.
Morris, J.
Sheldon, A.

Wandsworth.
Padwick, T.

Wanstead.
Rayson, H.

Warminster.
Humby, L. W.

Warrington.
Bennett, J.
*Webster, S. M.
Young, J. C.

Warwick.
Baly, J.
Williams, J. C.

Wath-on-Dearne.
Hick, A.

Wednesbury.
Gittoes, S. J.

Welwyn.
Lawrance, E.

Westbury.
Bailey, T.
Taylor, S.

West Bromwich.
See BROMWICH, WEST.

West Hartlepool.
Cooper, S. H.
Emerson, C.

Weston-super-Mare.
*Gibbons, G.
Rich, T.
Towerzey, A.

Weymouth.
*Groves, T. B.
Poole, H.

Whitby.
Taylor, H.

Whitehaven.
Kitchen, A.

Wigan.
Johnson, T.

Wilton.
Staples, E.

Wimbledon.
Mellin, J. P.

Winchcome.
Howman, P.

Windsor.
Boyce, J. P.
Grisbrook, E.
*Russell, C. J. L.
Squire, J.

Winsford, Cheshire.
Burgess, R.

Woburn.
Clarke, G. B.
Woodstock, C.

Wolverhampton.
Bailey, W.
*Brevitt, W. Y.
Dulley, J.
Fleeming, W.
Hamilton, H. B.
Hamp, J.
Payne, A.

Worcester.
Ferneley, C.
George, H.
Moore, S.
Twinberrow, J.
Vergo, C.
Whitfield, H.
*Witherington, T.

Worksop.
Jones, G. W.

Worthing.
Burt, J.

Wrexham.
Edisbury, J. T.
Francis, J.

Yarmouth. *See* GREAT YARMOUTH.

Yeadon.
Blatchley, T.

Yeovil.
Manning, T. D.
Maggs, T. C.

York.
Bennett, G.
Bulmer, F.
Dresser, R.
Hayland, W. C.
Holden, R.
Hopton, E.
Moon, R. P.
Tollinton, R. B.
Wilson, T. W.

York Town, Farnborough Station.
Claypole, A. H.

Addresses Unknown.
Bowden, W.
Carter, F. G.

*** The Secretaries will be glad to receive notice of any inaccuracies in this List.

PROGRAMME OF PROCEEDINGS

OF THE

BRITISH PHARMACEUTICAL CONFERENCE,

AT THE

SEVENTH ANNUAL MEETING, LIVERPOOL,

1870.

OFFICERS.

President.

W. W. STODDART, F.C.S., F.G.S., Bristol.

Vice-Presidents,

Who have filled the Office of President.

H. DEANE, F.L.S., Clapham Common, S.
PROF. BENTLEY, F.L.S., M.R.C.S., London.
D. HANBURY, F.R.S., F.L.S., London.

Vice-Presidents.

J. ABRAHAM, Liverpool.
H. C. BAILDON, Edinburgh.
H. S. EVANS, F.C.S., London.
J. INCE, F.L.S., F.C.S., London.

Treasurer.

H. B. BRADY, F.L.S., F.C.S., Mosley Street, Newcastle-on-Tyne.

General Secretaries.

PROF. ATTFIELD, Ph.D., F.C.S., 17, Bloomsbury Square, W.C.
R. REYNOLDS, F.C.S., 13, Briggate, Leeds.

Local Secretaries.

For Liverpool.—E. DAVIES, F.C.S., Royal Institution.
For Birkenhead.—T. DUTTON, Rock Ferry.

Committee.

F. B. BENGER, Manchester.
S. C. BETTY, London.
M. CARTEIGHE, F.C.S., London.
G. COOPER, Exeter.
T. B. GROVES, F.C.S., Weymouth.
W. MARTINDALE, F.C.S., London.
J. F. ROBINSON, Liverpool.
G. F. SCHACHT, Clifton.
F. SUTTON, F.C.S., Norwich.

Local Committee for Liverpool.

J. ABRAHAM, *Chairman.*
R. SUMNER. *Vice-Chairman.*
J. SHAW, *Treasurer.*
H. S. ALPASS.
G. BARBER.
T. BRITTEN.
J. M. BUCK.
H. COUPLAND.
F. D. DELF.
T. DOD.
E. EVANS, SEN.
W. J. FOULKES.
A. T. HORTON.
W. JARVIS.
S. JOHNSON.
C. JONES.
A. H. MASON.
T. MARTIN.
M. MURPHY.
J. PENDLEBURY.
A. REDFORD.
C. SHARP.
J. THOMPSON.
J. WOODCOCK.

The sittings of the Conference were held in the Royal Institution, Colquitt Street, Tuesday and Wednesday, September 13th and 14th, commencing at Ten a.m. each day.

An Exhibition of objects relating to Pharmacy was open at the room over the Savings' Bank, 93, Bold Street, from Tuesday, September 13th, till Wednesday, September 21st, from Ten till Six o'clock each day.

The Reception Room, where members and visitors might assemble, write letters, and obtain programmes and other information, was at No. 16, Adelphi Hotel, Lime Street.

By the kindness of the committee of the Lyceum, No. 1, Bold Street, the news room of that institution was open to members of the Conference during the week.

Monday, September 12th.

The EXECUTIVE COMMITTEE met according to notices from the Secretaries.

JOHN ABRAHAM, Esq., V.P., Chairman of the Local Committee, received the Officers and Resident Members at his house, 141, Smithdown Lane, at 7 o'clock p.m.

Tuesday, September, 13th.

The CONFERENCE met at 10 o'clock. a.m., adjourning at 12.30, p.m.; and at 2 o'clock, p.m., adjourning at 4.30, p.m.

Order of Business:

Election of Members.
Report of Executive Committee.
Financial Statement.
Reception of Delegates.
President's Address.

PAPERS.

1. *Report on the Purity of the Yellow Bees' Wax of Trade.* EDWARD DAVIES, F.C.S.

2. *Saccharo-Chirettine: a new Preparation of Chiretta.* DAVID S. KEMP, F.C.S.

3. *On the Strength of twenty-four Specimens of Saccharated Carbonate of Iron.* MR. J. J. NICHOLSON, Sunderland.

4. *The Apprenticeship and Early Training of Pharmacists.* Mr. F. B. BENGER.

5. *Automatic Apparatus form aintaining Constant Temperatures in Laboratory Operations.* Mr. F. B. Benger.

6. *Note on the Cultivation of the Opium Poppy in Australia.* Mr. J. W. Hood, Melbourne. (Communicated by Mr. T. N. R. Morson.)

7. *Analysis of Bitter Cassava Juice, and Experiments in elucidation of its supposed Antiseptic Properties.* Professor Attfield.

8. *Citrate of Magnesia of Pharmacy.* Mr. F. M. Rimmington.

9. *The Specific Gravity and Actual Weight of certain "Volume-measures" of various Liquids and Pharmaceutical Preparations.* Mr. F. M. Rimmington.

10. *Concentrated Compound Decoction of Sarsaparilla.* Mr. F. M. Rimmington.

On Tuesday Evening, at Six o'clock, p.m., a DINNER, at the Adelphi Hotel, was given by the Resident Members, to the President and Officers of the Conference.

After the dinner, a telegram, expressing the good wishes of the Conference, was sent to the American Pharmaceutical Association, simultaneously holding meetings in the United States.

Wednesday, September 14th.

The CONFERENCE met at 10 o'clock, a.m., adjourning at 12.30., p.m.; and at 2 o'clock, p.m., adjourning at 4.30, p.m.

Order of Business:

Announcement of a Telegram of "fraternal greeting" from the American Pharmaceutical Association, assembled in annual meeting at Baltimore.

Election of Members.

Reception of letters of invitation to the Conference of 1871.[1]

PAPERS.

11. *Discussion on Facilities for Pharmaceutical Education in the Provinces. Introduced by a Minute from the Council of the Pharmaceutical Society.*

12. *A Century of Old Books.* Joseph Ince, F.C.S., F.L.S.

13. *Sulphite of Zinc.* C. R. C. Tichborne, F.C.S., M.R.I.A.

14. *The Flax Lints of Commerce under the Microscope.* Thomas Greenish, F.R.M.S.

15. *The Fulmar and Fulmar Oil.* Edward C. C. Stanford, F.C.S.

16. *A few Notes on Aloes.* William A. Tilden, B.Sc., F.C.S.

17. *The Storing of Poisons.* Mr. Edward Smith, Torquay.

18. *On a better Excipient for the Official Pill Masses, and for exhibiting substances generally in a Pilular form.* W. Martindale, F.C.S.

19. *Note on Hydrargyrum cum Cretâ.* Mr. M. J. Ellwood.

20. *Microscopical Examination of Extracts made from Official Tinctures.* Mr. M. J. Ellwood.

21. *Laboratory Notes on Turmeric.* Mr. James Cooke.

22. *On the Chemical Constitution of Sulphurated Potash.* John Watts, B.Sc.

23. *Nepaul Aconite.* T. B. Groves, F.C.S.

24. *Note on Calamine.* R. Reynolds, F.C.S.

25. *The Ammoniacal Salts of Gas Liquor.* W. L. Scott, F.C.S.

26. *Examination of Commercial Salts of Lithium.* W. L. Scott, F.C.S.

Thursday, September 15th.

Excursion to Chemical Works at Widnes and Runcorn, followed by a Collation at Halton Castle, given by the Local Members to their Visitors.

Tuesday, September, 20th.

Alteration of Rules.
Election of Officers for 1871.
Appointment of place of meeting for 1871.
Grant from the "Bell and Hill's Book Fund."

BRITISH PHARMACEUTICAL CONFERENCE.

MEETING AT LIVERPOOL, 1870.

The British Pharmaceutical Conference commenced its seventh annual meeting on Tuesday morning last, in the lecture theatre of the Royal Institution, Colquitt Street, Liverpool, under the presidency of Mr. W. W. Stoddart, F.C.S., F.G.S. The Conference assembled shortly after ten o'clock, when the business was commenced by the reading of a very long list of candidates for membership by one of the honorary general secretaries. The candidates reside in all parts of the United Kingdom, and one of them in Kentucky, United States; they numbered about 920, and were duly elected by ballot.

The President acknowledged the presence of Mr. Sandford, the President of the Pharmaceutical Society, an announcement which was received with applause.

Professor Attfield then read the

Report of the Executive Committee.

During the past year your committee has been actively engaged in three important matters:—First, the organization of means whereby to produce such a Year-Book of Pharmacy for 1870 as the meeting at Exeter decided should be issued. Secondly, the conduct and completion of a system of canvassing for members amongst the pharmacists of England, with the double object of advancing the general aims of the Conference and securing a sum of money which would admit of the production of such a year-book without interruption. Thirdly, the appropriate disposal of the Bell and Hills' Library Fund—a sum of fifty guineas, generously given to the Conference by Mr. Thomas Hyde Hills, with the suggestion that it should be employed in further stimulating pharmaceutical education.

The Year-Book.—In accordance with your instructions of the last annual meeting, your committee proceeded to obtain the services of an editor, and to arrange for the publication of the yearly volume.

The salary of the editor was fixed at £100, this sum to cover the expenses incidental to the literary part of the work. In answer to the advertisement, four applications for the office of editor were

received. After due consideration of the claims of the respective candidates, your committee elected Mr. John Cargill Brough. A sub-committee of publication was then formed, consisting of Daniel Hanbury, F.R.S., W. W. Stoddart, F.G.S., Joseph Ince, F.L.S., Michael Carteighe, F.C.S., and T. B. Groves, F.C.S., with Prof. Attfield as secretary. These gentlemen have reported as follows:—First, that they have accepted the estimate of Messrs. Butler & Tanner, of Frome, to supply the Year-book on good paper, bound, and otherwise complete, on terms within the means at the disposal of the conference for the purpose. Secondly, that they have accepted the offer of Messrs. Churchill & Sons, of London, to undertake all matters connected with the advertisements on eligible conditions; to prepare the Year-book for delivery to members, and to place on the title-page the name and address of their firm as publishers.

Your committee has instructed the sub-committee to make such arrangements as shall ensure the issue of the Year-book not later than December 1st. They can, however, hardly dismiss this subject without an expression of deep sympathy with the editor under the trying circumstances which have contributed to cause some delay in the fulfilment of his arduous and responsible duties, and an expression of their earnest hope for his speedy restoration to health and strength.

New Members.—In July of the present year, the secretaries drew up a circular of invitation to membership, and sent a copy, with specimen pages of the Year-book, to every pharmacist in England not already a member of the Conference. This course, supplemented by the active exertions of the local treasurers and other working members, has produced the gratifying result of swelling our numbers from about 600 to about 1500; and even this high number may, in the opinion of your committee, be even further increased when the Year-book has been distributed, and opportunity been afforded for the recognition of its value.

The Bell and Hills' Fund.—Very soon after the last annual meeting of the Conference, the following letter was received from Mr. Hills by the treasurer:—

"Herewith I have much pleasure in redeeming my promise made at Exeter, and enclose a cheque for fifty guineas. Twenty-five guineas I give in memory of my good friend Jacob Bell, who I feel, would have been pleased with what the British Pharmaceutical Conference has done and is doing, and twenty-five guineas in my own name. I give the money to the council of the Conference to do

what they in their wisdom think will best promote a good feeling amongst pharmaceutists, and assist the education and well-being of assistants and apprentices. I give it without conditions. You will remember I suggested that ten guineas' worth of books should be presented to the pharmaceutical chemists and druggists of the cities and towns in which the members of the Conference may meet, as an addition to, or nucleus for, the formation of a library, where the assistants or apprentices may assemble for the purposes of study and mutual improvement. I think the Conference is a great success, and will do much good. The generous exhibition of good feeling of the chemists of Exeter and Torquay is worthy of imitation everywhere, London not excepted. The 19th and 20th of August will be red-letter days in my pharmaceutical calendar and green spots in my pharmaceutical life. The meetings bring forth kind sentiments and friendly feelings between men interested in the same business, and obliterate imaginary jealousies. With the best wishes for the success of the British Pharmaceutical Conference, believe me,

"Always yours faithfully,

"THOMAS HYDE HILLS.

"P.S.—The five artists' proofs of my good friend Jacob Bell which I promised to your committee, I will have framed to save the Conference trouble and expense."

The committee accepted in trust this handsome donation of Mr.



Hills, and returned him the warmest thanks of the Conference. Specimens of the device which had been stamped on the cover of

the "Bell and Hills" books, and of which the accompany engraving is a facsimile, were exhibited to the meeting.

A separate statement concerning this fund will be presented annually by the treasurer. To the library of the Exeter Branch Pharmaceutical Society, after appropriate inquiries and arrangements, your committee granted ten guineas' worth of such scientific books as were most required by the local committee.

Railway Arrangements in Connection with the Meetings of the Conference.—The privilege accorded by the railway companies to the British Association, namely, that of extending the time during which a return ticket is available, so as to include the whole period of the meetings, has often been desired by the members of the conference. The number of those travelling to the annual meeting hitherto has not been, however, sufficiently great to take the trouble of this arrangement would involve. But it was thought that perhaps the companies might allow the time covered by the return ticket to include the first Monday instead of, as usual, the first Tuesday of the Association week, and at Exeter last year, the president of the Conference addressed the president of the British Association on the matter. The answer was that that the officers of the British Association had repeatedly attempted, but in vain, to obtain from the railway companies the extension mentioned.

The Liverpool Meeting.—In conclusion, your committee desires to testify to the untiring efforts the Liverpool local committee has made to secure the success of the present meeting. The exhibition of objects connected with pharmacy has been entirely organized by the resident members. The thanks of the meeting will doubtless be fully expressed to the local committee when, at the close of the sittings, the members will have had opportunities of noticing the extent to which the desire for their comfort and pleasure have been thoughtfully and completely anticipated.

The Treasurer in Account with the British Pharmaceutical Conference, 1869–1870.

Dr.	£	*s.*	*d.*
To cash in hand, August, 1869	79	10	1
,, Sale of "Proceedings"	0	4	6
,, Interest from London and Westminster Bank. .	1	1	4
,, 846 Subscriptions, viz.:—			
1 for year ending June 30th, 1865.			
3 ,, ,, ,, 1866.			
16 ,, ,, ,, 1867.			
Carried forward . . .	£80	15	11

	Brought forward . . .			£80	15	11
33	,,	,,	,, 1868.			
132	,,	,,	,, 1869.			
509	,,	,,	,, 1870.			
149	,,	,,	,, 1871.			
3	,,	,,	,, 1872.			
			(Total 846)	211	10	0
				£292	5	11

Cr.

By General Printing—					
Taylor & Co.	£39	12	0		
Butler & Tanner	5	1	2		
J. Bell.	0	12	6		
				45	5	8
,, Cost of "Proceedings," Taylor & Co. . .				43	11	6
,, ,, Compiling Index				1	1	0
,, Expenses of Exeter Meeting				5	10	4
,, Advertising				2	4	6
,, Stationery				4	14	2
,, Directing Circulars				4	14	7
,, Postage				49	9	9
,, Various Petty Expenses				1	3	8
,, Bookbinder's Tool for "Bell and Hills" Books .				3	0	0
,, "Year-book of Pharmacy" (Editor's Salary in part)				35	0	0
,, Balance in hand				96	10	9
				£292	5	11

1870.	£	*s.*	*d.*
August. Balance in hand	96	10	9
Estimated Arrears of Subscriptions up to June 30th, 1870 (204 Subscriptions)	51	0	0

Bell and Hills' Library Fund, 1869–70.

To Cash received from T. H. Hills, Esq.	52	10	0
By Books forwarded to Exeter.	10	10	0
Balance in hand. . . .	£42	0	0

Examined and found correct,
JOHN SHAW,
JOSEPH F. ROBINSON.

Liverpool, September 5th, 1870.

The treasurer explained that he was reluctantly compelled to look to the resignation of his office, especially since the large accession to the numbers of the Conference would add very materially to the duties which he felt he had not the time to perform. He would be glad to retire to the ranks of the Conference, and continue in that position to do his best to serve its interests.

Mr. EKIN (Bath) much regretted to hear this announcement from their friend Mr. Brady, and thought that it suggested they ought to elect paid officers to assist both the treasurer and the general secretary.

The PRESIDENT said that Mr. Ekin's suggestion should be considered at a later stage of the proceedings.

On the motion of Mr. SUMNER, seconded by Mr. J. SHAW, the report and accompanying balance sheet were adopted.

Mr. DYMOND moved that the following members form a committee to report on the exhibition of objects relating to pharmacy:—Messrs. Carteighe, Davies, Ekin, Ince, Paul, Sutton.

This resolution was seconded by Mr. Greenish, and carried unanimously.

DELEGATES.

The following gentlemen were in attendance as delegates from various societies:—

Bristol Pharmaceutical Association.—The President, Mr. Stoddart.

Nottingham and Notts Chemists' Association.—Messrs. J. H. Atherton, and J. Rayner.

Edinburgh Branch of the Pharmaceutical Society.—Messrs. H. C. Baildon, George Blanshard, D. Brown, jun., and John Mackay.

Manchester Chemists' and Druggists' Association.—Messrs. W. J. Brown, W. J. Halliday, J. T. Slugg, F. B. Benger, and R. Hampson; Members of Council who may be present.

London Chemists' Association.—Mr. W. Martindale.

Ashton and Dukinfield Chemists' Association.—Messrs. Jabez Waterhouse and W. Bostock.

Scarborough Chemists' Association.—Mr. J. Whitfield.

Leeds Chemists' Association.—Messrs. R. M. Atkinson and R. Reynolds.

Bradford Chemists' Association.—Dr. Parkinson, Ph.D.

Sunderland Chemists' Association.—The Hon. Sec., Mr. J. J. Nicholson.

Bath Chemists' Association.—The Treasurer and Mr. C. Ekin.

Brighton Chemists' Association.—Mr. Savage.

Newcastle-on-Tyne Chemical Society.—Mr. H. B. Brady.

Foreign Members.

On the motion of Mr. Baildon, seconded by Mr. Evans, the following foreign members of the Conference were elected :—Mr. Carlos Murray, of Buenos Ayres; Senhor Joaquim Correa de Mello, of Campinas, Brazil; and Professor Soubeiran, of Paris. The number of foreign members, which, by the rules of the Conference, is limited to twenty, is now ten.

The President then delivered the following

Introductory Address.

Gentlemen,—It has now become an annual custom to commence our Conference meetings with an introductory address, the principal object of which is to briefly recall to our memories some of the most prominent observations or discoveries that have taken place during the previous year. Nor is the custom less instructive than interesting, for all who are in the habit of reading from month to month the labours of others, know full well the value of such occasional reviews.

The prosperous career of the Pharmaceutical Conference is fully apparent in this our seventh meeting, which promises to fairly rival any of the former ones, both in number of visitors and interest of papers.

The number of new members is so unprecedented as to call for special notice as a great subject for congratulation. No fewer than 900 having been added to our list since the last meeting, is a plain and unmistakable proof that the institution of the society has not been in vain. Indeed, if any evidence were necessary to prove the appreciation of our annual gatherings, it would be most abundantly afforded by the good people of Liverpool, who have left nothing undone to make our visit successful, and ourselves at home.

I feel assured that it is not only the wish of your committee, but of all the members, that our various visits throughout the kingdom should be productive of good, by planting a seed or two of the tree of knowledge, which by a little careful training and judicious culture after our departure, may in after-years yield the fruit of increased intelligence.

It appears to me that the fundamental idea of the Conference is the furtherance of pharmacy proper, by directing attention to the proper means of scientific education, or judicious training, and the advancement of our status as a profession.

Nowhere in the kingdom is there more desire for improvement or

stronger ambition for advance shown, than by the inhabitants of this part of her majesty's dominions. I would therefore appeal to their experience, whether or no the cultivation of the mind in scientific pursuits be not an exquisite source of pleasurable enjoyment and actual profit. It may be some curious reaction to be unravelled, some puzzling phenomenon to be explained, or the most profitable method of conducting an operation to be found, which, to the intelligent mind, furnishes a zest for exploration that must be felt to be properly understood.

What pleasure is there so innocent or so enthusiastic as the mutual examination of perhaps a common object under the microscope, or unfolding the nature of a substance with the subtle art of chemistry.

I do not for one moment believe that such works are reserved only for the recluse; nay, a spirit of enduring and cordial fellowship is created, by the glorious relish of meeting a kindred spirit, to whom you can show a treasure, or with whom you can hold familiar converse about your favourite investigations.

In every age the pursuit of knowledge has been the theme of song and verse. The very nature of a man possessing a *mens sana in corpore sano*, forces him to appreciate all that is beautiful, and fills him with an insatiable desire to discover the cause of the many wonders that are continually taking place around him.

> "Not a tree,
> A plant, or leaf, or blossom, but contains
> A folio volume. We may read, and read,
> And read again, and still find something new,—
> Something to please, and something to instruct."

That horrid, but perhaps necessary cry, *cui bono?* must sometimes be met, and surely past experience can satisfy the most mercenary spirit, and show that the so-called hobby of a philosopher, foolish as it may seem, frequently gives birth to results that must startle the most cold-hearted utilitarian.

I cannot endorse the assertion of Adam Smith, that a philosopher is a person "whose trade is to do nothing and speculate in everything." Where would be our telegraph if Faraday and Oersted had not studied the properties of an electrified wire? Or the wonderful calculations of astronomy if Newton had let the fall of an apple pass by unheeded? To the student nothing should be considered too trifling or unimportant.

But it is to the improvement of our own particular profession of

pharmacy that I wish to call your attention, hoping, as I do most sincerely, to enlist your interest.

We live and have our being in complete subjection to nature's laws. How foolish, then, to remain without learning what those laws require, so that we may have them with us and not against us!

Pharmacy, of all pursuits, is the one most dependent on the proper use of these laws. The pharmaceutist must make the most he can of the numerous animal, vegetable, and mineral substances with which he has to do, and to carry on his operations with the view of producing the best results. I am convinced that the most prosperous and happy of our body are those that bear these things in mind, and who look upon mental cultivation as a delight, and not as a necessary but disagreeable task.

Probably of all occupations for procuring the means of subsistence, none surpasses our own in the small return for the large amount of work done. Truly the pharmaceutical motto ought to have been, "Nihil est aliud magnum quam multa minuta."

Thirty years ago the pharmaceutist was literally a tradesman, and for thirty years we lived in a theoretical anticipation of our character and status being raised to a higher standard. Our ever-to-be-remembered Jacob Bell and William Allen, with others of advanced views, steadily persevered in the attainment of this object, and hoped on in the face of strenuous opposition to see the things that we see.

Two years ago we obtained the long-wished-for Pharmacy Act, but at our last meeting we had no practical experience of its working. All was then in embryo. Since that time a twelvemonth has elapsed; and, though too short a time perhaps for a conclusive verdict, yet I venture to say that it has worked well, and now more than ever its expected benefits loom more decidedly in the future.

Let us always beware, however, of infusing a mercenary spirit into the conduction of our Pharmaceutical Society. Its main object is, and ever must be, the upraising of our pharmaceutical education, and not the lowering it into a trades' union, a spirit which I am bold to say would prove its ruin.

We must not be too impatient of a little more nursing by the valued hands of the older members of the Pharmaceutical Society.

Chemistry, botany, and physics are to us only secondary in importance to a well-grounded general education.

The study of botany is peculiarly a necessity, since we derive so many of our preparations from various plants; but its demands have been so well put before you on former occasions by our

esteemed Professor Bentley that I must not take up your time by dwelling on them now.

Our younger members will need no reminder from me that great changes have within the last few years taken place in chemical philosophy. Chemistry now, more than ever, claims to be an exact science; and, although I fear many of us have bemoaned the change in notation, and the attendant difficulty of unlearning an old system, yet the more simple explanation of puzzling organic metamorphoses will amply repay any trouble taken by the persevering student.

Nearly twenty years ago, our countryman, Professor Williamson, introduced to public notice the modern view of chemical types. Three years afterwards Gerhardt added to the professor's water-type two others, the hydrochloric acid and ammonia.

From these views we have a more complete classification of the elements and their combinations than we ever had before. Ere many more years have elapsed, works on chemistry must be arranged on quite a different plan, especially with regard to the terms inorganic and organic.

In our older books the compounds included under these heads were supposed to be as distinct as if they belonged to the animal and mineral kingdom. The term "organic" then denoted those compounds which were thought only producible in the bodies of plants and animals, and that their production was due to a supposed "vital force." Of course I here allude to organic and not *organized* bodies.

In later years many of these have been, and probably all will be formed by the chemical transformation of inorganic elements or molecules; as cases in point, I would mention the artificial production of alcohol, sugar, and acetic acid.

Perhaps the best definition of an organic substance is, that it is a carbon compound, and that carbon in chemistry is analogous to desmids and diatoms in microscopy. The latter seems to be debatable ground between the animal and vegetable kingdoms, as carbon is between organic and inorganic chemistry.

Oxalic acid was once considered to be only found in the juices of plants. Now it has been prepared from purely inorganic elements. By the decomposition of a piece of chalk we produce the well-known gas carbonic anhydride or carbonic acid. Then by passing this gas over sodium and sand we have oxalic acid, identical in every respect with that found in the *Rumex* and *Oxalis*.

$$\underset{\text{Carbonic acid.}}{2\,CO_2} + 2\,K = \underset{\text{Oxalate of potassium.}}{K_2C_2O_4}$$

Our well-known alcohol is another instance of the artificial production from inorganic ingredients of what was formerly supposed to be formed only by the fermentation of starch or sugar.

By passing the vapour of that commonest of all minerals—sulphur, over the surface of red-hot charcoal, we have carbon disulphide, the disagreeable liquid so often used for dissolving India-rubber. Then, again, if we mix this with hydro-sulphuric acid gas, and pass the mixture over red-hot copper, or with carbonic oxide over iron, we may, as proved by the experiments of Mr. Berthelot, produce olefiant gas, or, as it is now called, ethylene (C_2H_4).

$$\underset{\text{Carb. disulph.}}{2CS_2} + \underset{\text{Hydro-sulph. acid.}}{2H_2S} + 6Cu = \underset{\text{Ethylene.}}{C_2H_4} + \underset{\text{Cupric sulphide.}}{3Cu_2S.}$$

Lastly, if we dissolve the ethylene in strong sulphuric acid, dilute with water and distil, we shall have as the result alcohol, similar in every way to that prepared by the distillation of grain—

$$\underset{\text{Ethylene.}}{C_2H_4} + \underset{\text{Sulph. acid.}}{H_2SO_4} + H_2O = \underset{\text{Alcohol.}}{C_2H_6O} + \underset{\text{Sulph. acid.}}{H_2SO_4.}$$

We might, in like manner, follow the synthetical formation of acetic acid from the same inorganic materials, carbon and sulphur.

The vegetable alkaloids, it is true, have not yet been artificially produced; but so great an advance is being made in the formation of organic compounds by artificial means, that I think it is not too chimerical an idea to expect a pharmaceutical solution of the philosopher's stone problem, and to manufacture quinia and morphia on the large scale. We should then be entirely independent of the *Cinchonaceæ* and *Papaveraceæ*, on which we now entirely rely for these invaluable medicines.

In the January number of the *Journal de Pharmacie et de Chimie* is an article by M. Bourgoin on the electrolysis of the vegetable alkaloids,—an interesting subject that has not hitherto received the attention it deserves.

It has for some time been known that the salts of vegetable alkaloids, when subjected to galvanic action, obey the usual law of metallic bases and acids, for the alkaloid appears at the negative and the acid at the positive pole.

The author states that the sulphates of atropia, brucia, strychnia, codeia, and quinia, when acted upon by the galvanic current, behave exactly like ammonium sulphate—

$$\underset{+}{NH_4SO_4} = \underset{+}{SO_4} + \underset{-}{NH_4}.$$

But, more than this, he goes on to say, that when an *acid* solution

of either alkaloid was used, and the conductibility of the liquid thereby rendered more perfect, the electrolytic action was much more violent. The solution became coloured round the positive electroide, and evolved oxygen, carbonic acid, and carbonic oxide gases.

The most remarkable result of the experiment was that, in each case, *the colour produced was identical with that seen when the alkaloid was acted upon by strong nitric acid.* Thus, atropia and strychnia gave a yellow, brucia a blood-red, codeia an orange colour.

This effect was the result of true oxidation, and not from the formation of nitric acid.

The experiment appears to strengthen the idea of Liebig, that the nitrogenous alkaloids are substitution compounds containing amidogen, NH_2; in other words, that they may be derivatives of ammonia, NH_3, in which one atom of hydrogen has been displaced by an organic molecule.

Having alluded to botany and chemistry, allow me to take up a little more of your time by giving an illustration of the advantage of a knowledge of natural physics, because many of the most beautiful phenomena pass under the dispenser's notice every day.

At our last meeting I had the honour of alluding to some experiments, showing the practical application of spectral analysis to several of our fluid preparations. By means of the spectroscope many elements have since then been detected in articles of the materia medica, which, a few years ago, were considered great rarities.

On the table are the ashes of many pharmacopœial substances which contain the metals rubidium, lithium, and strontium.

Lithium has been noticed in creta præparata, potassæ tartras acida, radix taraxaci, radix rhei, *Gentiana lutea*, *Atropa belladonna*, *Nicotiana tabacum*, *Triticum vulgare*, commercial pearlash, raisins, carbo animalis, carragheen, and kaolin.

Strontium exists in many specimens of taraxacum, creta præparata, calamine, etc.

Rubidium has been detected in syrup made from loaf sugar which most probably had been manufactured from Austrian beetroot, also in oak-bark, from trees growing on beds of lias in the neighbourhood of Bristol, and in tea, coffee, and cream of tartar.

Many samples of bismuthum album show the green line of thallium very distinctly, while oxide of zinc will sometimes indicate the presence of indium.

By some authors it has been denied that plants absorb from the earth such metals as are not absolutely essential to their nutrition. Experiments, however, afford strong evidence to the contrary.

Mr. R. Warington (*Journ. Chem. Soc.*, 1865) found in the ashes of the beech and birch ·193 per cent. of manganese. In a case of cattle-poisoning at Wells Assizes, the animals were proved to have been killed by eating plants containing lead derived from the soil on which they grew. Analysis showed that grass, weeds, fungi, thistles, and shrubs, contained a poisonous quantity of lead, although totally unaffected in their growth.

The triassic marls of Cotham, near Bristol, are celebrated for an abundance of celestine, or sulphate of strontium. An examination of the ashes of plants and shrubs growing on these strata nearly always shows the presence of strontium in small quantity. I have detected this metal in *Taraxacum*, *Arabis*, *Senecio*, *Capsella*, *Poa*, *Senebiera*, and *Scoparium*.

In a communication to the Royal Society (*Proc. Roy. Soc.*, 18, 546) Mr. Huggins says he has found traces of lime in every specimen of magnesia he has examined, even in what was sold as pure magnesium oxide and magnesium chloride.

When magnesium oxide was examined, the heat of the oxyhydrogen flame was necessary to bring out the calcium lines distinctly. He noticed that it was always most satisfactory to employ a minimum quantity of oxygen, for when too much was used they were not so distinctly visible. Dr. Emerson Reynolds, whose experiments were recorded in the same paper, gives the same results.

But perhaps of all the phenomena observed in pharmaceutical optics, that termed fluorescence is the most striking and beautiful. It is the ghostlike appearance which we see every time we dispense a bottle of mixture containing quinine or syrup of red poppies. By very delicate methods of observation the singular fluorescent property may actually be seen on the white demy in which we wrap our bottles before sending them out.

It was formerly supposed to be occasioned by the reflection of light from an irregular surface, or from particles mechanically suspended in a solution, as when tincture of arnica is added to distilled water. In such mixtures, the effect to the eye very much resembles fluorescence, yet is of a very different character, and may be distinguished by the rays of light being polarized, which is never the case with the true diffusion of fluorescence.

The most convenient way of viewing these phenomena is by looking at the solution under examination through a prism, or by the actinic light of burning magnesium, or by passing the spark of an induction coil through a central vacuum tube.

Fluorescence may thus be observed in many substances of the

Pharmacopœia, such as guaiacum, sulphate of quinine, *Hyoscyamus*, *Stramonium*, *Curcuma*, *Cannabis indica*, *Digitalis*, *Lobelia*, litmus, orchil, madder, and *Papaver Rhœas*.

For some time the phenomena were explained by Sir J. Herschel, under the term epipolism, and afterwards by Sir D. Brewster as internal dispersion. It however remained for the president of the British Association, Professor Stokes, to discover the true explanation, viz., that the effects were caused by a change of refrangibility in the rays of light. The index of refraction is always diminished, because the length of the light wave is increased and the velocity lessened.

For instance, the invisible actinic rays which lie beyond the violet, are shown by quinine in the blue, by stramonium and curcuma in the yellow, and by chlorophyll in the red. In every case the change is towards the red end of the spectrum.

It sometimes happens that fluorescence is observed to commence in two parts of the spectrum, and would indicate that the solution under examination contained two distinct chemical compounds.

The bark of the horse-chestnut (*Æsculus Hippocastanum*) is a remarkable example of this. Its beautiful green fluorescence was formerly supposed to originate from a crystalline substance called æsculin. A more accurate series of experiments by Mr. Stokes has shown that two parts of the spectrum were simultaneously affected.

This fact aroused the professor's suspicion, which a chemical analysis afterwards proved to be well grounded. Two glucosides were produced, viz., æsculin ($C_{21}H_{24}O_{13}$), which gives a sky-blue light, and paviin ($C_{27}H_{30}O_{13}$), which gives a bluish-green. When an aqueous mixture of both these principles is submitted to examination, a light is perceived in every particular identical with that from an infusion of the original bark.

Thus it is that we often observe the different branches of natural philosophy dovetailing as it were into each other, and hastening to complete the chain of evidence required for the elucidation of some interesting problem.

The past year has been prolific in so many new and important discoveries that it becomes difficult to point out one or two only for consideration.

At our last meeting Mr. Hanbury brought before our notice a new hypnotic, the chloral hydrate. Then it was an expensive curiosity, now it is in every one's pharmacy, and manufactured in enormous quantities. The general impression is, that it will prove a very efficient remedy, especially where opiates are inadmissible.

It is, however, much to be regretted, that already another preparation has been introduced into the market, which only contains 70 instead of 90 per cent. of chloral, and which is declared by Dr. Liebreich to be devoid of any therapeutic power. The chloral alcoholate, as it is called, is not so deliquescent as the hydrate, and has a boiling point of 113·5° Cent. and a sp. gr. 1·34, while the true hydrate boils at 97° Cent., and has a sp. gr. of 1·57.

A very simple method of detecting the imposition by the use of ammonia is described by Mr. Umney. (*Pharm. Journ.*, Aug. 6, 1870.)

Sulpho-carbolic acid is another preparation that has recently been brought into use. It is made by combining sulphuric and carbolic acids in their molecular weights (49 to 94) at a temperature of 290° F.

That true chemical union occurs is evident from the fact that sulpho-carbolic acid gives no precipitate with chloride of barium or nitrate of lead. It produces a characteristic purple colour with perchloride or pernitate of iron.

Many physicans affirm that it is a more powerful disinfectant than plain carbolic acid. The salts most commonly used are the sulpho-carbolates of soda and zinc.

Last year Mr. Hanbury alluded to the madder plant, a species of the *Rubiaceæ*, which, although not in our Materia Medica, yet is employed as a medicinal agent in manufacturing districts, and will, therefore, be my excuse for again alluding to it.

Its principal consumption, as you know, is for tinctorial purposes, and its value may be easily conceived when no less a sum than £1,000,000 is annually paid by us for foreign madder.

It owes its colouring matter to alizarine, which, singularly enough, does not exist in the living plant, but is produced by a kind of fermentation.

A few months ago two Germans succeeded in artificially making alizarine in quantity by the destructive distillation of coal-tar, like the well-known aniline dyes, alizarine being a product from anthracine as aniline is from benzol.

During the past twelve months our London and provincial brethren have not been idle at their evening meetings, for subjects of the highest importance have been discussed.

In London Professor Redwood, with his usual aptitude, has given a series of most useful notes on the Pharmacopœia, which have in their turn elicited practical remarks from our ever ready friend, Dr. Attfield, and other members. Abstracts of these have appeared in

the Journal, to which periodical I must also refer you for an amount of work done in the provinces, and which I think will thoroughly stand the test of criticism. Nor must I forget our Transatlantic *confrères*, who have been prosecuting pharmaceutical researches with great diligence. Their transactions are well worth an attentive perusal.

Since our last meeting at Exeter an International Congress of Pharmacists has been held at Vienna, and I trust we may have the pleasure of reciprocating the friendly feeling evinced on that occasion by a cordial invitation to our own shores.

In conclusion, I trust I shall be forgiven if I impress on every one present the importance of sinking petty differences of opinion, and uniting together in advancing the object for which we have met here to-day, viz., the promotion of pharmacy. We certainly have the opportunity, and we ought to take the greatest care not to let it pass unheeded or unimproved.

Government shows a disposition to help us in every way, and will give a decided preference to those who pass our examinations. For instance, they will admit no candidate for the office of naval dispenser until he has a satisfactory diploma from the Pharmaceutical Society. In return we are in duty bound to see that we fulfil our trust, and discharge the moral obligations that they have entrusted to our care.

We are pharmaceutists, that is, professed preparers of compounds containing the active principles of articles in an acknowledged Materia Medica, and such, in my opinion, ought to be our chief business, and the object of thoughtful study.

If my view be correct, our proper and legitimate aim ought to be attaining a knowledge of the best method of making those preparations.

I am well aware that in order to make both ends meet, a great number of our body combine a multitude of heterogeneous goods in their common stock. Nevertheless, I submit that it does not alter my idea of the desirability of a pure and simple pharmacy.

The general tendency of the medical profession of the present day is to leave to us dispensing of prescriptions which they prescribe. It is then plainly our duty to lose no time in rendering ourselves competent to undertake that office in the best possible manner.

At a late address Professor Huxley spoke very strongly on this point. He said, when speaking of the curriculum of study, "I would abolish Materia Medica altogether. · · · I cannot understand the arguments for obliging a medical man to know all about

drugs and where they came from. Why not make him learn about cutlery, because he uses knives?"

I quote this as a very significant expression and sign of the times. I must confess I cannot go quite so far as the professor, for the dispenser well knows the difficulty in dispensing that often arises from a want of knowledge in the properties and peculiarities of the drugs with which the prescriber has to do.

No one, I presume, would call the medical profession a trade, because in some out-of-the-way spot in the country, and many miles from a pharmaceutist, a medical practitioner dispensed his medicine or even the prescription of another. Then why should we be prevented from raising our status and entering the professional ranks, because some of our brethren in the country find it necessary to amplify their already small income by the sale of more general accessories.

It must be borne in mind, too, that the present time is an anomalous one, and will gradually pass away, like that of the old apothecary.

Let us then accept the challenge that is now virtually thrown at our feet, and do the best we can under the circumstances. In future years our children and successors will give us credit for and enjoy the advantages which will have arisen from our present endeavours in their behalf. It may be that all the thanks the founders of pharmacy will ever obtain, will be given by them long after we have passed away.

Nevertheless *we* should err if *we* forgot the long-tried, steady and faithful work done by such men as Squire, Morson, Deane, and many others whose names need only be mentioned.

Why should we not then unite hand in hand, and with the unselfish and free spirit of true science, proceed steadily onwards, surmounting every obstacle, and letting the motto on our banner be "Excelsior!" for

> "All the means of action,
> The shapeless masses—the materials—
> Lie everywhere around us. What we need
> Is the celestial fire to change the flint
> Into transparent crystal, bright and clear."

I cannot conclude without alluding to the great exertion of Messrs. Attfield, Brady, and Reynolds, on behalf of this Conference. I do not hesitate to say that to them we are in a great measure indebted for our successful progress. Few know the immense amount of work that has been willingly gone through by their untiring exertions.

Long may *we deserve* and appreciate their self-denial, and long,

very long, may we enjoy the privilege of having them as our official guardians.

In a society like the present, money matters necessitate delicate, firm, and careful management, and this we have in our esteemed treasurer, Mr. H. B. Brady, who, though always considerate, is ever watchful for our interests; I sincerely hope, therefore, that we may hail him for many more years as honorary treasurer to "The British Pharmaceutical Conference."

On the motion of Mr. Mackay (Edinburgh), seconded by Mr. Williams (London), a vote of thanks was accorded to the president for his excellent address; which compliment he briefly acknowledged.

The following papers were then read:—

THE PURITY OF THE YELLOW BEESWAX OF PHARMACY.

By Edward Davies, F.C.S.

In this paper I am only able to give the result of the examination of some samples of wax purchased in Liverpool, five samples of crude wax obtained from a wholesale house, and four samples sent to me for analysis from a Liverpool firm, of the history of which I am ignorant.

I shall first give the methods employed, then a table of the results, and conclude with a few remarks. The melting-point presents a little difficulty, and, after trying various methods, it was found better to take the solidifying-point. A test-tube containing about 100 grains of wax was immersed in hot water in a beaker until perfectly melted. A thermometer was inserted in the tube and the water allowed to cool gradually, the wax being constantly stirred until the bulb of the thermometer could not be seen when in the middle of the wax. The temperature then remains steady during the solidification for about two minutes, and there is no difficulty in getting the same result any number of times within half a degree.

The presence of paraffin is shown by the low melting-point, but no idea of its amount can be obtained from the degree shown, owing to the varying melting-points of different samples of paraffin. The only method of determining the amount of paraffin found at all practical, consists in destroying the wax with fuming sulphuric acid. 50 grains of the wax, with 1½ oz. by measure of fuming sulphuric acid, are put into a small beaker holding about 5 oz., and gradually heated in a water-bath. Great care must be taken to stir it very slightly at first, especially if only a small quantity of paraffin is present, as the action is apt to become unmanageable. When the

violence of the action is over, the heat is raised to 100° C. for about an hour and a half, and the mixture occasionally stirred. It is then left to cool very slowly in the water-bath, and, when quite cold, the paraffin will be found forming a layer on the black semi-liquid mass. It is carefully removed, washed with water to remove as much of the adhering acid as possible, dried, and again heated for an hour in a smaller beaker with ½ oz. of the acid. This gives the paraffin perfectly white, and it is then washed, dried, and weighed. There can be no doubt that there is some loss, as the common paraffin employed contains colouring matters destroyed by the acid; but I know of no other method at all useful, though I have carefully tried some which have been proposed.

For the estimation of rosin, the action of cold alcohol seems sufficient. To 90 grains of pure wax, 10 grains of rosin were added, by melting them together and thoroughly incorporating. On exhausting with cold alcohol, by rubbing the wax in a mortar with successive small portions of alcohol, filtering, and evaporating on a water-bath, a residue was obtained weighing 10·54 grains. It was brittle and, when heated, gave an unmistakable smell of rosin. Pure wax yields 2·4 per cent. to cold alcohol, and rosin is not entirely soluble, but one of these about balances the other.

No starch was found in any of the samples, and they were all perfectly soluble in turpentine.

Specimens.	Solidifying Point.	Soluble in Alcohol.	Paraffin.
Pure Scotch wax	151·5	2·4 p. c.	none.
Crude wax, Gambia	152·5	3·10	not tested.
,, ,, No. 1 . . .	154·0	2·40	,,
,, ,, No. 2 . . .	153·0	3·60	,,
,, ,, No. 3 . . .	147·5	—	,,
,, ,, No. 4 . . .	147·0	—	,,
,, ,, No. 5 . . .	146·0	—	none.
Purchased samples, No. 1 . . .	153·5	1·8 p. c.	not tested.
,, ,, No. 2 . . .	153·0	2·28	,,
,, ,, No. 3 . . .	152·0	3·18	,,
,, ,, No. 4 . . .	152·0	2·34	,,
,, ,, No. 5 . . .	150·5	5·20	,,
,, ,, No. 6 . . .	147·0	—	,,
,, ,, No. 7 . . .	145·0	—	none.
,, ,, No. 8 . . .	139·0	—	13·30
,, ,, No. 9 . . .	137·5	—	36·60
Samples sent for analysis, No. 1 .	142·0	—	42·60
,, ,, No. 2 .	140·0	—	43·36
,, ,, No. 3 .	135·0	—	56·50
,, ,, No. 4 .	134·0	—	56·00

These results show that the degree given in the P. B. of 140° F. is too low; pure yellow wax melts at 151·5° F., and no sample, not containing paraffin, has a melting-point below 145°. I think that 150° should be the standard, for samples containing more than 40 per cent. of paraffin may be made to agree with the Pharmacopœia standard, if a paraffin with a sufficiently high fusing-point be selected. The question may seem an unimportant one, but a difference of 16° in the fusing-point of two samples of wax must considerably affect the quality of ointment made from them, especially in hot weather.

The effect of the application of paraffin to the skin, though probably not injurious, is not sufficiently known to render its presence a matter of indifference. Most of the samples were bought in the lower parts of the town, and the results show that in Liverpool there is not much cause to complain. I have to thank Mr. Thomas Williams for valuable assistance in working out the above results.

The CHAIRMAN said that the fatty material referred to by Mr. Davies, might probably be stearine, which was used in the neighbourhood of Bristol for adulterating wax sometimes to the extent of fifteen or twenty per cent. He had found as the result of experience that if there was a crack about an inch from the upper edge of the cake, together with a greasy appearance, these characters indicated the presence of stearine.

Professor ATTFIELD remarked that this was an interesting practical paper, and that the results were in favour of the suggestion that the melting-point assigned to beeswax in the Pharmacopœia should be raised ten degrees above the number now given. Some discussion took place as to the mode of determining the melting, or rather solidifying, point of wax and similar materials.

Mr. GROVES (Weymouth) pointed out that a difference of ten degrees in the result of experiment might be due to the method adopted. He recommended dipping a thermometer bulb in the melted wax, and after the film of wax had solidified upon the bulb, suspending the thermometer in water, which was gradually heated until the film of wax became transparent and liquid; then reading off the temperature at which this took place as the melting-point.

It was also mentioned that the presence of Japan wax would render the melting-point of beeswax low, but no known means seemed to be available for detecting this admixture, except the occurrence of that kind of bloom on the surface of the wax so adulterated, which is characteristic of Japan wax itself, as stated by Mr. Parkinson, Ph.D., Bradford.

Mr. DAVIES said that he had found that pure wax, when melting, passes suddenly from the opaque to the transparent condition, but that when paraffin was present, the transition was gradual.

Mr. BRADY (Newcastle) recommended that as this was a subject of much pharmaceutical interest, well-authenticated samples of wax should be sent to Mr. Davies for examination, and that he should be requested to continue his inquiries so as to report on the subject at a future meeting of the Conference.

SACCHARO-CHIRETTINE, A NEW PREPARATION OF CHIRETTA.

BY MR. D. S. KEMP, BOMBAY.

The two official preparations of chiretta, the *tincture* and the *infusion*, although efficient as containing the active matter of the drug, present inconveniences for habitual administration. The *tincture* becomes impaired in strength by keeping, and is partially incompatible with salts of iron and of the alkaloids; and the infusion, besides having the same incompatibilities, will not keep longer than a few hours.

The *extract*, prepared in the usual way, is a still more unsatisfactory preparation, containing, as it does, a mere fractional part of the bitter originally in the dried plant. I have not seen an extract of chiretta prepared entirely *in vacuo;* probably such would be a valuable product, although still liable to deterioration. No preparation can, in my opinion, be good which undergoes evaporation by heat or exposure to the air, as I have always found that the bitter principle in such a process disappears, and is replaced by a tasteless brown resinous matter, separating from the aqueous solution. The following is the process by which I have succeeded in obtaining a trustworthy preparation of chiretta:—

An infusion of chiretta was made at 120°, and the colouring matter precipitated by an excess of solution of subacetate of lead; the product, after filtration, was a nearly colourless but very bitter liquid. The addition of a sufficiency of ammonio-acetate of lead (mixture of ammonia and solution of acetate of lead) then produced a white precipitate, consisting of the whole of the chirettine in combination with lead. The precipitate being well washed, first with ammoniacal water, then with alcohol, was treated with a mixture of sulphuric acid and alcohol, and filtered. The filtrate containing the

chirettine, was further treated with carbonate of lime to remove the excess of acid. The filtered liquid, which was of indescribable bitterness, I had no means of subjecting to more appropriate evaporation than spreading out on a clean glass plate; the result being a transparent extract, pale yellow in colour, dry at first, but in time becoming moist. This product I consider to be impure chirettine; and the same has always resulted when modifications of the above process were tried.

It is a neutral substance, quite soluble in water and alcohol. Its aqueous solution, when evaporated in the air, deposits a tasteless brown resin, into which the chirettine becomes entirely converted if the evaporation is continued to dryness. It is very difficult to preserve the pure solution at all from this change; if aqueous, it deposits the resin; if alcoholic, it darkens in colour. But the addition of glycerine, will preserve either solution apparently unchanged for many months. Dilute acids do not affect chirettine, but liquor potassæ hastens its conversion into resin.

I now prepare two pharmaceutical forms of chiretta founded on this process, one, saccharo-chirettine, a dry product; the other, liquor chirettine, a liquid.

Saccharo-chirettine.—To prepare this I follow the process above described, with an economical modification, namely, instead of drying the chirettine, I add to its pure solution a proportion of sugar (20 lbs. for each 60 lbs. of chiretta used), dry the whole by gentle evaporation, and powder it. The quantity of bitter principle present causes quite a minute increase in the weight of the product, which is, notwithstanding, so bitter that 1 grain is perceptible in a gallon of water.

When well prepared, in a dry atmosphere, saccharo-chirettine is nearly white. It forms a clean solution with water, and in portability and handiness for administration, I submit that it is a most convenient pharmaceutic form of the drug it represents. The strength of saccharo-chirettine is as one to three of the herb; 10 grains being equal to 30 grains of chiretta, or about $2\frac{1}{2}$ fluid ounces of infusion. It is given as an antiperiodic, in doses from 10 to 15 grains, three times daily, and here, in Bombay, considered equal to 3 to 5 grains of quinine.

A decided advantage that can be given it over chiretta is that some uniformity of strength can be guaranteed by regulating the quantity of sugar used according to the proportion of ammonio-acetate of lead required to precipitate the chirettine.

That chiretta varies considerably in strength I have found by experience.

The CHAIRMAN said that he had not found the tincture of chiretta give any deposit on keeping in this country. Probably the difference in this respect might be due to climate.

Professor ATTFIELD remarked on the peculiarity of the active principle of chiretta in undergoing decomposition when its solution was evaporated, as being a character worth examination from a chemical point of view, as well as in its bearing on the making of pharmaceutical preparations of chiretta. Within the past few weeks Flückiger and Hölm had published a paper on chiretta. They had isolated its active principle, *chiratin* (C_{26} H_{20} O_{20}) which they considered to be, not an alkaloid, but a neutral body closely allied to the glucosides.

Mr. GROVES approved highly of the principle on which the manufacture of saccharo-chirettine was based. He also thought that the satisfactory results obtained by the author in this instance seemed to show the wisdom of using sugar in certain pharmaceutical preparations as a preservative, and he referred to the old practice of preparing medicines in the form of troches, as one probably useful on that account, which might with benefit be reverted to in our day, especially in the case of medicines destined for export to foreign countries.

THE STRENGTH OF TWENTY-FOUR SPECIMENS OF SACCHARATED CARBONATE OF IRON.

BY J. J. NICHOLSON, SUNDERLAND.

I have recently had occasion to examine several samples of saccharated carbonate of iron, and been struck with the great difference in their composition. It is surprising that so great a diversity should exist, for the process of manufacture is exceedingly simple, although a certain amount of care is necessary to secure a good and permanent preparation.

However, the result of my examination shows a discrepancy which, were the article of a more active nature, would be rather alarming; even as it is, we know what importance is attached to the action of this preparation in many serious cases, and to say the least, it would be well if we could have an article of more uniform strength.

Each of the twenty-four samples I have examined was obtained either by myself or friends from pharmacists of position in their

several towns, and nothing can show more plainly how little reliance is to be placed on the saccharated carbonate of iron as a medicine than a glance at the following table, where its strength may be seen to range from No. 1, which contains 41·9 per cent. of carbonate, to No. 24, which only contains 22·6 per cent. The principal cause of this difference, I believe, is to be found in the preparation, which requires care, rapidity, and attention, as when finished and properly dried, the change from keeping is so slow and gradual as to be scarcely worth taking into consideration; and among the samples here shown, the oldest have not, by any means, turned out the worst; as, for instance, No. 10, which has been kept in paper for seven years, and yet comes up to the ordinary commercial standard of strength, which Professor Attfield gives in his "Manual of Chemistry" as 37 per cent.

Table showing amount of real Carbonate of Iron in twenty-four specimens of Saccharated Carbonate of Iron.

	Iron.	Iron in the ferrous state.	Carbonate Iron.	
Ferri Carb. Sacch. ought to contain.	22·0	22·0	45·50	
No. 1	21·0	20·25	41·90	Liverpool.
2	22·4	19·68	40·75	Newcastle.
3	22·4	19·44	40·23	Aberdeen.
4	23·8	18·86	39·10	Nottingham.
5	28·0	18·63	38·58	Sunderland.
6	21·0	18·63	38·58	Liverpool.
7	21·0	18·04	37·36	London.
8	30·8	17·82	36·90	Newcastle.
9	21·7	17·82	36·90	London.
10	28·0	17·82	36·90	Sunderland.
11	19·6	17·22	35·66	London.
12	19·6	17·22	35·66	Edinburgh.
13	22·4	17·00	35·20	Torquay.
14	22·4	17·00	35·20	Belfast.
15	22·4	16·20	33·55	Gloucester.
16	22·4	16·20	33·55	Sunderland.
17	33·6	15·39	31·87	Bristol.
18	18·2	15·39	31·87	Belfast.
19	22·4	14·58	30·19	Harrogate.
20	21·0	13·77	28·50	Liverpool.
21	12·6	12·15	25·16	Sunderland.
22	21·0	11·34	23·48	Nottingham.
23	22·4	11·34	23·48	Aberdeen.
24	25·2	10·92	22·61	Castle Eden.

In No. 13, which was sent to me as a very old sample, only 5·4 per cent. of carbonate has become useless through oxidation. This is not at all above the average quantity lost in the preparation.

No. 24, is known by my informant to have stood thirteen years in a wide-mouthed bottle without a cork, and how many before that he is not able to say, which probation may certainly be considered a fair trial of its permanence.

The relative age of different samples may be pretty nearly determined by their degree of solubility in dilute hydrochloric acid: those I know to be old have always required a considerable amount of heat for their solution, while a recently prepared specimen will dissolve in acid of the same strength at ordinary temperatures. I think it is shown by these examples that the sugar is a very efficient preservative when the preparation is finished, but during the process there is scarcely a sample that escapes oxidation. Some makers appear to have tried to get over the difficulty by largely increasing the quantity of iron, so as to allow for the oxidation of a considerable portion, as instanced in Nos. 5, 8, 10, 17, where the iron is considerably in excess of the normal quantity; but in these cases the loss has been proportionately great, while in No. 21, where the proportion of iron is much smaller, it has been nearly all preserved in the active ferrous state, the quantity in the ferric form being much less than 1 per cent.

In No. 1 also, the whole, or nearly so, of the carbonate has been preserved, and I think this may be classed as a perfect specimen of *ferri carbonas saccharata*. In all these there are traces of the presence of sulphates, but in none have I found any appreciable quantity.

The PRESIDENT stated that according to his experience the crystallized sugar prepared by the centrifugal process by Messrs. Finzel of Bristol, yielded a better product than was the case when ordinary loaf sugar was used. He attributed this to this sugar retaining less atmospheric air.

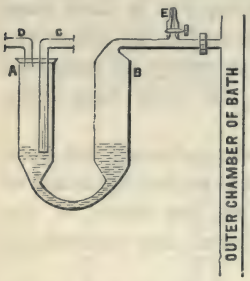
Mr. WILLIAMS said that in his experience he had found the oxidation of the iron-precipitate depended very much on its bulkiness and the amount of liquid mixed with it. He recommended that it should be made as dense and as free as possible from adherent moisture before mixing it with the sugar. For this purpose, the solutions used should be concentrated, the precipitation effected at the boiling-point, and, after washing the precipitated carbonate, it should be pressed to make it as dry as possible.

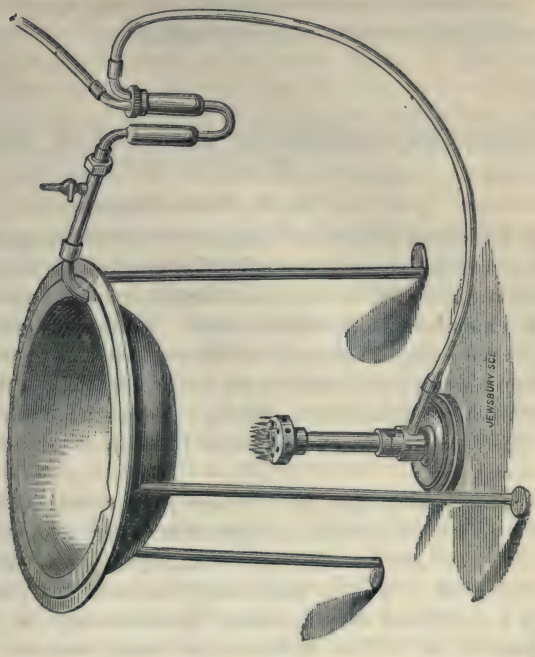
Dr. Watts pointed out the method of the French Codex, in which all the operations involved in the preparation of the carbonate were performed in the presence of sugar, with the object of preventing oxidation.

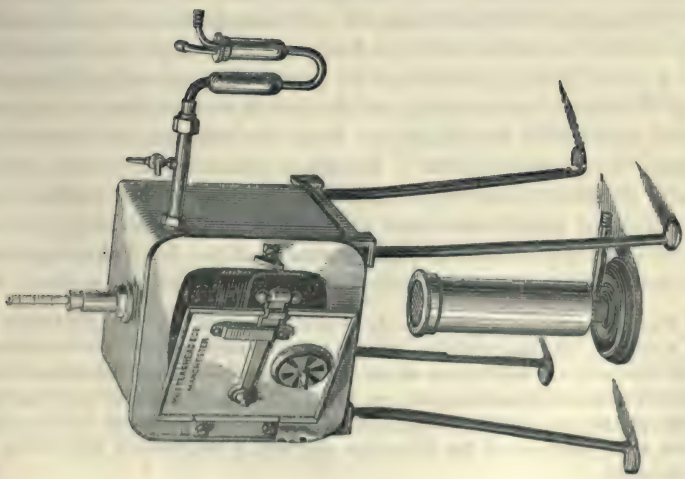
AN AUTOMATIC REGULATOR FOR MAINTAINING CONSTANT TEMPERATURES IN SOME CHEMICAL AND PHARMACEUTICAL OPERATIONS.

By F. Baden Benger.

The advantages claimed for this arrangement are extreme sensitiveness, certainty of action, and simplicity of construction; it is applicable to any operation in which gas is used as a source of heat, whenever it is desirable to maintain a constant temperature without continual watching, as in the air-bath or drying closet, fractional distillations, evaporations, etc. The regulator consists of two iron cylinders, A and B, about $2\frac{1}{2}$ inches long and $\frac{3}{4}$ inch diameter, communicating with each other at the bottom. Through the movable top of A is passed an iron pipe, C, reaching almost to the bottom, and another, D, going only just through the corner; B is connected by a union-joint with the outer chamber of the air-bath; sufficient mercury is placed in the cylinders to fill the tube connecting them, and to stand about $\frac{1}{4}$ of an inch above the bottom in each. The outer end of the tube D is now connected with the gas, and that of C with a Bunsen's or other burner placed beneath the air-bath. The air in the outer chamber becoming heated, expands, and pressing on the mercury in B, forces it towards A, where, by rising, it gradually closes the slits in the tube C, and diminishes the supply of gas at the burner; by opening the small tap E, the pressure is immediately removed, and the gas again passes freely. When the desired temperature is attained in the drying-chamber, the tap E must be closed, after which the apparatus acts automatically, any slightly higher temperature produced by increased pressure of gas from the "main" or other cause instantly rectifying itself by diminishing the supply at C, whilst cooling by draughts, etc., is at once balanced by a greater flow.




JEWSBURY, SCE



Upon the table are specimens of a drying closet and an evaporating dish, constructed on this principle.*

THE APPRENTICESHIP AND EARLY TRAINING OF PHARMACISTS.

By F. Baden Benger.

The education question being one of the foremost and most important of the day, I trust that a few observations on the early training of those connected with our own vocation may not prove uninteresting to the members of this Conference. It must be evident to all those who have thought seriously on the subject, that our present system of apprenticeship is inadequate to the higher standard of scientific education required in our calling. It has answered its purpose in the past, but requires modification to adapt it to the new pharmaceutical era.

Apprenticeships are, for the most part, served in small businesses, where pharmacy proper is subservient, and necessarily so, to less dignified but more remunerative employments. The proprietors are but too glad to add to their scanty incomes the premium received with a pupil, and they maintain the advantage by getting as much as possible out of him in the way of useful service. The leisure of some, and the ability of others is too limited to afford much personal instruction or direction in scientific matters to those they have undertaken to instruct in the art and mystery of pharmacy; at the end of his term the youth has, we will assume, gained much useful information connected with his business; has taught his fingers to fold a parcel neatly, and his eye to guess a pennyworth of hair-oil in a Worcester sauce bottle, but in how few cases has he any accurate systematic knowledge of even the elements of chemistry, botany, or materia medica! He then proceeds, at a very small salary, to one of those superior establishments where "neither apprentices nor arsenic are kept on the premises." At length it becomes necessary for him to pass an examination; his knowledge has increased, but it is a disorderly knowledge. If he has worked, he

* The author claims originality only in what appears to him the main feature of the apparatus, viz., the regulator,—the air in the outer chamber of the bath acting by its expansion and contraction on an india-rubber diaphragm having been suggested as a means of regulating the gas by Mr. W. Dancer, of Cornbrook Chemical Works, and others; but the substitution of the mercurial regulator for the india-rubber valve removes all the difficulties met with in the practical application of the principle.

probably feels how much of his precious time he has wasted in working in wrong directions; he finds that, instead of getting, as he expected, more leisure for study as he grows older, he gets less, and he sees no other course open to him but to cram under the directions of a professional crammer. A friend who has been prepared by Mr. So-and-so recommends that gentleman's services, and night after night he crams his memory with formulæ, decompositions, diagrams, antidotes, natural orders, and very unnatural methods of keeping certain names and facts within reach for, say, ten days. With these, if he can keep calm, and does not lose his presence of mind at critical moments, he probably gets through. But this large meal of many courses disagrees with a mind not accustomed to generous diet; assimilation does not follow; a reaction takes place, accompanied by a lasting distaste for similar mental food, and by the time the holiday which usually follows a pass is over, he has become confused as to his facts, and foggy as to his formulæ, but he thanks his stars that the ordeal is over.

The outline I have given of the studies and opportunities of the apprentices of the period, though happily contradicted by many bright examples, is, I believe, broadly true. Now this system, whilst it swells the ranks of pharmaceutical chemists, and adds to the funds of the Pharmaceutical Society, is not conducive to our real progress. We must remember that the knowledge which will be useful to a man is not that which he possesses on an examination day, but that which he retains afterwards. I think we may take it as a proven fact that very few apprentices do, or even can, qualify themselves during their term. The range of studies has become so wide that very much must be done either before or after, and the advantages of doing it first appear to me many and great. A boy who had received sound elementary instruction in chemistry, botany, and materia medica before entering upon his apprenticeship, would be to a great extent self-dependent; it would then be entirely his own fault if he did not find daily opportunities of applying and increasing his knowledge; work which would have been mere irksome drudgery to him would be interesting and instructive, because he would find in it the application of principles and laws with which he had previously become familiar.

The next question is, How is this knowledge to be given? I think by the establishment of special technical schools for boys intending to become pharmacists. Mr. Schacht has estimated the number of young men entering the business annually as 1693. Is it too much to expect that a sufficiently large proportion of these to support the

experiment would be able and willing to do so? The laboratories at Bloomsbury Square are overflowing; there is no lack of students now ready to spend money for knowledge which they would have found doubly useful if obtained earlier. There is reason to believe that our body will be recruited from a wealthier class than hitherto.

A considerable sum will, in most cases, have to be expended one way or another, earlier or later, on the scientific education of the chemist if he is to attain, or, at any rate, to maintain a position, and I think the earlier in his career some of it is invested the better. Moreover, I am disposed to believe that some such plan as I propose would be in the end cheaper as well as better. A pupil having spent twelve months in this technical school, would be a much more useful, or at least less troublesome, appendage to most businesses than the apprentice of to-day. Possibly some of the leading firms might be willing to take him at a more moderate premium. At the end of a three years' indenture he should pass the minor with honours, and would then be certainly able to command higher remuneration than most men who have been four years in the business can now do.

I do not propose any detailed scheme, but make this suggestion in the hope that some of you may be able and willing to help its elaboration. The course of instruction should be elementary, but *thoroughly sound*, the main object being to set up signposts, warranted, as Mr. Ince says, to point in the right direction. When the apprentice sets up his own, they too commonly direct him by supposed short cuts, which lead him into all sorts of tangled difficulties. The teachers in the various departments should be men of real ability and experience. I have not much faith in the educating power of the "certificated science teacher," who is now ubiquitous. Much as we may respect a young man who, in addition to the practice of some honest handicraft, such as shoemaking, lectures on chemistry, botany, and one or two other branches of natural science, to the mechanics and artisans of his neighbourhood, we may doubt if he is the most suitable person to influence boys better educated in ordinary subjects than himself. It is generally admitted that a thorough master of a science is required to impart quickly and accurately the rudiments of his subjects, and these are what we want.

The establishment should possess a good museum of drugs, and a garden of medicinal plants, and should be under the direction of a thoroughly practical pharmacist. How much might be learned by a boy in such a school in, say, twelve months! It should give him such an impetus as would last while he lived. How interesting to him would be the occasional half-hour's stroll in the country, for he

should know much of physiological and something of systematic botany by that time! He would pursue his studies with the sign-posts full in view; and would he make a less successful business man for the scientific bias he had received? I think not. The acquirement of business tact would be just as necessary, but none the more difficult. Amongst the minor advantages to be derived from this year's training, may be mentioned the bond of fellowship which would be formed between kindred spirits, and which, thus early established, would greatly tend to the diffusion of pharmaceutical knowledge and the furtherance of the objects aimed at by our own Conference.

If the introduction of this subject brings about a discussion from which any more practical conclusions shall be derived, I have not wasted your time this morning.

The discussion on this paper was postponed until the next day, when the subject of pharmaceutical education in the provinces would be brought before the Conference at the suggestion of the council of the Pharmaceutical Society.

The meeting adjourned at 12.30.

NOTES ON THE CULTIVATION OF THE OPIUM POPPY IN AUSTRALIA.

By John W. Hood, Chemist, Melbourne.

This paper was communicated by Mr. T. N. R. Morson, together with the following letter addressed to the Chairman of the Liverpool Local Committee:—

"38, Queen's Square, W.C.,
"*September* 10*th*, 1870.

"My dear Mr. Abraham,—I this day send you the paper on Opium received last mail from Melbourne; it is a highly interesting paper, and at the present time a very important one. I have no doubt that very good opium can be produced in Australia, and at a reasonable price. To the inhabitants of this part of the globe its home culture is very important, on account of the heavy duty on that imported from Europe. I have examined several samples sent me at various times, and although they varied very considerably in the quantity of morphia they contained, I considered them all to be genuine opiums.

"I also send you the specimens I received per post with the paper: please exhibit them. I should like to have them returned to me when the Conference is over. I wish to test some of them, and afterwards to send them to the museum in Bloomsbury Square, in Mr. Hood's name.

"T. N. R. Morson."

The farmers in Victoria, for a good many years, have been touched with a desire to try new crops and new industries. Among the many ventures, suitable or unsuitable, was the cultivation of the poppy and the production of opium, which has been tried with varying success for the past four or five years.

I have felt some interest in this subject, and have collected many samples from various districts, and also performed some rather crude experiments myself on the growth of the poppy, which I beg to submit. I feel that perhaps my conclusions may be of little value, but as I propose extending my investigations annually, I hope eventually to arrive at the best means of producing the greatest amount of opium together with richness in morphia, from a given quantity of poppy plants.

The first opium produced in any quantity in Victoria was at Sunbury, a village about twenty-two miles from Melbourne. Soil strong, rich, volcanic. It* was a good-looking opium; on analysis it only yielded some 2 per cent. of morphia, but contained an abnormal amount of other opium constituents, notably narcotine, of which there was about 8 per cent. I sent samples of this, and other opium from about the same locality, to T. N. R. Morson, Esq., who, as reported in the *Pharmaceutical Journal* for January, 1869, stated, "It was of great beauty, as far as external characters were concerned, it had the perfect odour of good opium, and it dissolved with the Persian character, but singular to say it contained very little morphia, but a great abundance of the other principles known to exist in opium.

This opinion, from so well-known an authority on all concerned with opium, of course reached Melbourne, and was published here with the effect of greatly discouraging the industry. However, a few did continue to plant and produce, and this last season probably a hundredweight and a half was brought into the market here, where it realized about thirty shillings (30*s.*) per lb., as it proved to

* Sample 1.

be a very good opium, containing from 8 per cent. to 10 per cent. of morphia.

Mr. Morson's opinion being so much thought of, I sent him samples. His report being a favourable one, I had it published in the agricultural papers, and now some attention is again given to the opium culture, and I expect that sufficient will shortly be made to enable a trial shipment to be made to London, as from the high price ruling for opium and its preparations it is very desirable that new sources of supply be discovered. With the beautiful climate and fine soil of Australia, eminently adapted for poppy-growing, enough opium should be produced to make a marked influence on the price in the European markets, as the growers here will be well paid at from ten to twelve shillings per pound: but as our consumption here is enormous, owing to the great number of Chinese colonists, it will probably be some years before the supply greatly exceeds the local demand.

I send herewith samples of opium from various localities, produced in 1867–8, 1868–9, and 1869–70.

The poppy is sown here in the months of June, July, and early part of August, the opium being collected in the summer months of January, February and March. Most of the seed was obtained from Smyrna, and produces plants from five to seven feet high, each bearing three or four flowers of four large white petals. There is also some East Indian variety cultivated with double purple or black flowers; but it is not popular, as it only has one flower on each plant, and yields but little opium.

In 1868 I was desirous of ascertaining whether special manures or manner of culture had any influence on the amount of opium yielded and its richness in morphia, and, to determine it, made the following experiments:—

I took six plots of virgin ground, and treated them as follows:—

Nos. 1 and 4 were manured with well-decayed stable manure.

Nos. 2 and 5 were entirely without manure.

Nos. 3 and 6 were manured with spent lime from soft-soap works, containing about 3 per cent. of potash, and with Peruvian guano.

Each plot was the same size, and was drill-sown with the same lot of seeds on the following dates:—

Nos. 1 and 2,	sown on	June 13th.
Nos. 3 and 4	,,	July 1st.
No. 5	,,	,, 12th.
No. 6	,,	,, 20th.

The plants were all above ground about ten days after each sow-

ing, and about a fortnight after I thinned them out, leaving 150 plants on each plot. Plots 1, 3, 4 and 6 received no artificial irrigation, but depended for moisture entirely on the rainfall, while Nos. 2 and 5 were watered well every week until just before flowering. When ripe, I carefully cut the heads and collected the opium, obtaining the following yields:—

No. 1	Yielded of Opium in Grains	153.
„ 2	„	177.
„ 3	„	159.
„ 4	„	171.
„ 5	„	189.
„ 6	„	203.

The greatest yields were from Nos. 5 and 6, the last planted. Nos. 2 and 5, which were without manure, but with plenty of moisture, yielded much more than Nos. 1 and 4, those manured with stable manure. The opium was of the ordinary consistence, and, as far as possible, free from leaves or accidental impurities. Now, as to the richness of the samples in morphia.

On assay from one hundred grains of each sample, well dried, I obtained:—

No. 1	Grains of Morphia	$4\frac{8}{10}$.
„ 2	„	$6\frac{3}{10}$.
„ 3	„	$6\frac{9}{10}$.
„ 4	„	$4\frac{6}{10}$.
„ 5	„	$6\frac{5}{10}$.
„ 6	„	$7\frac{1}{10}$.

I also obtained a notable quantity of morphia from the aqueous extract of the bruised green heads from which the opium had previously been as far as possible extracted.

As the same seed, differently treated, gives plants which yielded opium of different values, I naturally infer that manures, nature of soil, want of moisture, or excessive supply of water, and general manner of cultivation, have a great influence on the value of the opium produced. Last season (1869–70) I performed the same experiments with relatively the same results. This year I hope to extend my operations and try many other manures, and have requested all who are growing opium to favour me with all particulars respecting manures, soil, mode of culture and collection and yield, and, if possible, a sample of the opium.

I cannot imagine my experiments as at all conclusive, as the differences might have occurred on different parts of the same ground; but if I find that treatment with stable manure, as a rule

throughout the colony, gives a worse yield than if manured with guano, I may then reasonably think that Peruvian guano is more fit for manuring poppies than stable manure; and so on, until I arrive at the best manure and best method of cultivation of the poppy, so as to obtain the greatest and most valuable yield of opium.

Samples of opium accompanying this paper:—

No. 1. Produced in 1867–8, from 80 poppies, at Sunbury, twenty-two miles from Melbourne.

No. 2. Produced in 1869–70, near Gisborne, thirty-two miles from Melbourne, on a river-flat of rich alluvial soil; yield 84 lbs. per acre.

No. 3. From near Bairnsdale, Gipp's Land, in a very cold climate, yield over 60 lbs. per acre.

No. 4. From near Gisborne, 1867–8; yield 50 lbs. per acre.

No. 5. Grown in 1868–9, at Soh Yarra, near Melbourne, collected and dried on tin-plates, so that it is the pure juice dried.

No. 6. Grown in 1868–9, at Dromana, on the shores of Port Phillip Bay, in very sandy soil; the produce of 420 plants.

Mr. Dymond (Birmingham) observed that the plan adopted by the author of cutting off the poppy capsules, and then extracting the opium from them, was not that practised in the East. He had made experiments with garden poppies.

Mr. Sutton (Norwich) said that some years ago a medical gentleman in his neighbourhood grew a considerable number of poppies, and extracted opium by incision from day to day, but the air-dried gum contained less than 2 per cent. of morphia. The season, however, was damp and somewhat cold, and this he (Mr. Sutton) believed was detrimental to the production of any large proportion of morphia. The question was really very little understood, but from experiments in various parts of the world it seemed an undoubted fact that fine, dry, warm weather produced, in any tolerable climate, a fair quality of opium; whereas, in a contrary season, the other and less valuable constituents (narcotine, etc.) were predominant. It was therefore probable that the effect of sunlight and warmth would be to convert a portion of these constituents into the more valuable form of morphia. He also stated that it was his intention to grow some poppies in his own district, should he be able to procure good seed, and also forward some to Australia, for the purpose of investigating the matter more fully.

Mr. Dymond remarked, that in his opinion we ought to go to Smyrna for seed.

Mr. BRADY said he understood some of the Norfolk specimens of opium contained a very large percentage of morphia. He believed it was considered impossible to produce opium on a large estate with a large staff of labourers; and in Asiatic Turkey poppies are grown for the purpose only by small farmers. The French had tried the growth of poppies in Algeria, but with little success, so that other conditions besides climate seemed to be requisite. The extract of poppy capsules had been found by Mr. Deane and himself to differ entirely from true opium in microscopic characters.

Mr. GROVES (Weymouth) expressed his belief that the production of opium was a continuous process of the incised poppy, and, therefore, that the proposal to obtain opium, or anything resembling it in strength, by expressing the unripe capsules, would prove delusive. He had himself, on two occasions, examined carefully the ripe capsules. On the first occasion, he had recovered sufficient alkaloids to justify further experiment. The second experiment was conducted upon 50 lbs. of crushed capsules. From that large quantity was obtained,—narceia 23 grs., morphia 75 grs., narcotine 36 grs., codeia 33 grs. He had a decided impression that the "crushed" capsules were inferior in quality to the "poppy-heads."

ANALYSIS OF BITTER CASSAVA JUICE, AND EXPERIMENTS IN ELUCIDATION OF ITS SUPPOSED ANTISEPTIC PROPERTIES.

BY PROFESSOR ATTFIELD, PH.D., F.C.S.,

Professor of Practical Chemistry to the Pharmaceutical Society.

The bitter cassava (*Manihot utilissima*, Pohl) is a plant whose tuberous roots yield the starch which, when granulated, is known as tapioca. The juice of the root is said to be somewhat poisonous, but, when heated, the noxious principle disappears, and the concentrated fluid is used as the basis of various sauces (cassareep). This juice, freed from starch and boiled, is commonly believed to be a powerful antiseptic. (Shier, "Report on the Starch-producing Plants of the Colony of British Guiana," Demerara, 1847; Hamilton, *Pharmaceutical Journal*, 1st Series, vol. v., p. 30.)

A specimen of the "boiled juice of the bitter cassava," having a dark brown colour and a consistency of thick cream, was recently sent to me from Jamaica (through Mr. Shepheard, of Chester), with

a request that it should be analysed and otherwise examined, with the view of ascertaining whether or not its stated power of preventing decay in meat rendered it worthy of application as a preserving agent on a large scale. The following analytical and other experiments were conducted :—

One hundred parts of the juice contain

Water		39·2
Vegetable matter :—		
Albuminoid substance	9·0	
Alkaloidal bodies	none	
Volatile oil	trace	
Cane or grape sugar	none	
Starch	none	
Mucilaginous and other inert matter	37.7	
	——	46·7
Mineral constituents :—		
Iron (as peroxide)	2·8	
Other inorganic salts	11·3	
	——	14·1

Experiments.

First Series.—Several cooked mutton chops were well rubbed with various quantities of the juice, and others lightly rubbed, and some smeared or covered. These and a raw chop were set aside in separate cupboards. In two days the raw chop was tainted, and in three putrid. In three days one chop gave evidence of mould; in four days more mould, on the others also; in five to eight days, all more or less mouldy; on the seventh day one chop tainted; on the eighth to twelfth, all were tainted and some putrid.

Second Series.—Some cutlets cooked in water containing small and large quantities of cassava juice, and one cooked without juice, were set aside in separate cupboards. In seven days, the cutlet without juice was putrid; in fourteen days, the others had become mouldy and putrid, more or less quickly, and to a greater or less extent.

Third Series.—Beef was affected in a similar manner, and to about the same extent, as mutton.

Fourth Series.—Extract of meat was diluted with warm water, and three portions set aside.

a. Unflavoured.

b. Flavoured with salt and pepper.

c. Flavoured with cassava juice.

In four days, *a*, the simple diluted extract, was tainted, and in five putrid. In five days, *b* and *c* were slightly mouldy; in nine days tainted, and in fifteen putrid,—each to about the same extent.

Remarks.

The analysis and other experiments show that cassava juice contains nothing that imparts to it antiseptic powers of great value. Its property of retarding the decomposition of raw or cooked animal matter is not greater than that possessed by such common aromatics as pepper; and wholly inadequate to warrant its employment in preserving meat on any large or important scale.

The foregoing experiments were conducted at temperatures of atmosphere varying from 60° to 80° F., in different places, and under other varying conditions. The sample of juice was apparently of average quality, though containing a larger proportion of iron than is present in a specimen in the Museum of the Pharmaceutical Society. Nothing was wanting to make the examination fair and crucial.

I am of opinion that the slight antiseptic character of bitter cassava juice is due to the presence of a very small quantity of aromatic oil, and that the juice is of no practical value as an agent for preserving carcases of meat.

Since these experiments were made, larger trials of the juice have been conducted in Jamaica, with similar results to those now described.

Mr. Groves remarked that the antiseptic properties attributed to cassareep were perhaps suggested by the little tendency to decomposition shown by the fluid from which it was manufactured. But this fluid contained a notable quantity of prussic acid, the influence of which in retarding fermentation was very remarkable. Of course cassareep would contain none of this volatile body; it must necessarily be dissipated during evaporation.

Mr. Sutton (Norwich) said that the preservative properties of the cassareep must be very considerable, as he believed it was the custom of families in Jamaica, and other places in the West Indies, to keep a large pot of the prepared juice in the house, into which were thrown odd pieces of cooked meat, bones, etc., where they were preserved for almost any length of time. So long as they were kept under the surface no decomposition occurred.

Professor Attfield said that probably any semi-fluid mixture

containing volatile oil would answer the purpose of cassareep. He had kept a mutton-chop sweet for a month by immersing it in a decoction of cocoa containing a little pepper.

ON THE SO-CALLED "CITRATE OF MAGNESIA" OF PHARMACY.

By Mr. F. M. Rimmington.

There appeared in the *Pharmaceutical Journal* for June 15th a letter by me on a mode of estimating the value of the so-called citrate of magnesia by estimating the amount of carbonic acid; and I then stated that the amount of acid was influenced by two causes: either by bad management, thereby driving off by heat too much of the carbonic acid; or, by the diminution of the proportion of the bicarbonate of soda, and also as a matter of course, that of the tartaric acid by increasing the proportion of sugar; for it follows as a natural consequence, that if one of the constituents be increased, the others will be diminished in the same ratio in 100 parts. Now the goodness of the article depends upon its agreeableness as a beverage, and this again depends upon the amount of carbonic acid given off at the time of mixture.

Since writing that letter I have examined several samples, and tabulated the results below.

The letters A, B, C, distinguish samples from three different makers. Those not marked are miscellaneous samples.

One sample of "A," on analysis, gave 44 per cent. of bicarbonate of soda, but only yielded 15 per cent. of carbonic acid, being only two-thirds of the quantity that had been present originally.

A sample of "C" contained 32 per cent. of bicarbonate of soda, and yielded 8·2 per cent. of carbonic acid, being only one-half the amount that must have been in combination with the soda.

Table of Analytical Results.

No.					
	1	contained	12	per cent.	CO_2
	2	,,	9	,,	,,
	3	,,	8	,,	,,
A	4	,,	15	,,	,,
B	5	,,	16	,,	,,
	6	,,	12·5	,,	,,
C	7	,,	10·5	,,	,,
B	8	,,	13	,,	,,
A	9	,,	16·7	,,	,,

No. 10	contained	9·3	per cent.	CO_2
C 11	,,	8·0	,,	,,
B 12	,,	12·5	,,	,,
A 13	,,	14·8	,,	,,
B 14	,,	14	,,	,,
A 15	,,	15	,,	,,
C 16	,,	8·6	,,	,,

The average of four samples marked A is 15·4.
,, four ,, ,, B ,, 13·9.
,, three ,, ,, C ,, 8·9.

The difference between the highest and the lowest being double the amount of carbonic acid, and as a consequence, one-half the quantity of A would make as good an effervescing draught as double the quantity of C,—a difference too great not to be perceptible.

Mr. Dymond (Birmingham) protested against the Conference officially recognising the application of the term "citrate of magnesia of pharmacy" (which was the title adopted for this paper) to this preparation, inasmuch as it was a complete misnomer. He had formerly objected to it, and thought the preparation should at most be termed "citrate of magnesia of commerce." It was in reality a mixture of tartaric acid, sugar, and carbonate of soda. He thought this Conference, as representing and expressing the highest aims of pharmacy, ought to maintain a scientific purity and exactness in its nomenclature.

Mr. Sumner endorsed this opinion, and thought it derogatory to the pharmaceutical body that the practice should exist; and this was not the only misnomer the Conference ought to denounce. Similarly improper names were continually creeping in from time to time.

Mr. Abraham asked how this material was to be labelled when sold.

Mr. Dymond replied that he always labelled it "citrate of magnesia so-called."

Mr. Sutton considered it should be labelled "granulated tartrate of soda."

Mr. Williams (London) said citrate of magnesia was easily made, and was very pleasant tasting. For that purpose calcined magnesia and crystallized citric acid should be heated together without any addition of water. Under these conditions they united together, forming a soluble salt.

Mr. Sumner said that he believed that King's was a real citrate of magnesia.

Mr. Abraham said he had not analysed King's, but he believed

that it was composed of bicarbonate of soda, tartaric acid, and sulphate of magnesia.

Mr. SUTTON, of Norwich, had subsequently examined this medicine, and found it to consist of bicarbonate of soda, tartaric acid, and sulphate of magnesia.

Mr. BRADY, whilst deprecating the use of names conveying a wrong impression as to composition, thought that to be consistent, those who advocated an abrupt change in this particular case must extend their protest to "seidlitz powders," "salt of lemons," and a number of similar terms for articles in very general demand.

Mr. SANDFORD (London) was glad this question of misnomer had been brought forward; he had always protested against applying definite chemical names to articles not having the composition thereby designated, and he thought it was specially the duty of this Conference to discountenance such practice. The evil was increasing; we had effervescing "nitrate of potash," of which a drachm would contain five grains, but what was the other portion of the powder? It was, too, a matter of importance to dispensers. Physicians sometimes prescribed "effervescing citrate of potash," for which in one shop ordinary "lemon and kali" would be supplied, in the next citrate of potash, throwing doubt into the mind of the patient.

Mr. PHILLIPS (Crewe) had been accustomed to sell this preparation in Paris under the name of "granular effervescent aperient," in bottles with "citrate of magnesia" stamped on them. The French Government would certainly prevent its sale under the false name commonly adopted in this country. Citrate of magnesia is there largely employed in doses of 40 to 60 grammes as a saline purgative, and is known under the name of "Limonade Purgative."

Mr. GROVES confirmed the statement made by the last speaker as to the dose of true citrate of magnesia given in France being 60 grammes, or about two ounces. If the alkaline citrate or tartarate were given, they underwent a process of combustion in the organism, and became carbonate before elimination by the kidneys. This should be recollected by prescribers.

Mr. ANDREWS (London) said that Mr. Albert E. Ebert, of Chicago, had suggested that the term "granular effervescent salt," should be applied to the preparation commonly known as "granular citrate of magnesia.

Mr. UMNEY (London) said he had never found more than 17 per cent. carbonic acid in the samples of citrate of magnesia he had examined.

It was then moved by Mr. DYMOND, seconded by Mr. SUTTON:—

"That this Conference is of opinion that the term 'citrate of magnesia,' as applied to the ordinary granulated preparation of commerce, is a misnomer, and should be discouraged as inconsistent with the true interests of pharmacy; and seeing that a similar compound is already recognised by the British Pharmacopœia of 1867 as 'citro-tartrate of soda,' this name should as rapidly as possible be brought into general use.'"

Mr. GREENISH objected to the special character of the latter part of the resolution, and considered that there was no necessity for alteration of name so long as granular effervescent citrate of magnesia was only a commercial article, and one never prescribed; if difficulties were thrown in the way of its retail sale by chemists, grocers would necessarily take it off their hands.

Professor ATTFIELD thought this a very difficult question to deal with by any formal resolution. Had not Mr. Dymond's most praiseworthy objects been gained by the discussion, which would, of course, be published? Should we not have "soda-water," "seidlitz-powders," "Epsom-salts," and such articles, next brought under similar condemnation?

Mr. UMNEY considered that the pharmacists were in the hands of the physician for such granular preparations as effervescent "nitrate of potash," and in those of the public for the popular "citrate of magnesia."

Mr. SAVAGE (Brighton) said, whilst the discussion was one of some importance, it seemed to him undesirable to make any alteration of a name so well known to the public, and the best course to adopt would be to avoid committing this Conference to any resolution not likely to be generally adopted.

Mr. REYNOLDS (Leeds) thought that the second part of Mr. Dymond's motion deserved support fully as much as the first, since prescribers were liable to overlook the large quantity of alkaline citrate and tartrate united with the remedy they prescribed, but not indicated by the name employed.

Mr. ABRAHAM (Liverpool) suggested that the term "citro-tartrate of soda," commonly called "citrate of magnesia," should be used. He objected to the term "granular effervescent aperient," inasmuch as no pharmaceutical description was comprised in such a name.

Mr. R. M. ATKINSON (Leeds) thought it was no secret that the article was entirely wanting in both citric acid and magnesia, as

citrate of magnesia could not be made at the price at which this was offered in the market; he therefore considered it an imperative duty of the Conference, if it wished to hold an honourable position and retain the confidence of the public, that not only in the present instance, but for the future, it should condemn all such impositions when brought before it.

Mr. J. H. Richardson (Cork) said he entirely approved of the resolution.

Mr. Mackay (Edinburgh) felt a difficulty about the second part.

Mr. Ince (London) took the same view, and the mover having consented to an alteration, the motion was carried as follows:—

"That this Conference is of opinion that the term 'citrate of magnesia,' as applied to the ordinary granulated preparation of commerce, is a misnomer, and ought to be discouraged as inconsistent with the true interests of pharmacy."

THE SPECIFIC GRAVITY AND THE ACTUAL WEIGHT OF CERTAIN "VOLUME-MEASURES" OF VARIOUS LIQUIDS AND PREPARATIONS.

By F. M. Rimmington.

Our system of weights and measures, as well as our pharmaceutical practice of using weights and volume-measures for fluids, are both so irregular and unsystematic, that all engaged in pharmacy, cannot but have experienced the inconvenience of having constantly to convert measures into weights and weights into measures. The frequent experience of this want myself, suggested to me, some time ago, the desirableness of a table of the principal liquids in use in pharmacy, accurately ascertained from authentic samples, in order that exact computation may be made by its data. The utility of such a table is confined to such liquids as profess, or are intended to be, of Pharmacopœial strength.

Some attempts of a similar kind have been made in some of the foreign Pharmacopœias, and a paper was read by Mr. Laird at the Norwich Conference, but he only gave a few examples, and the scope of the paper was confined to the specific gravities of tinctures.

It was my intention to have added another column, giving the percentage amount of extractive contained in the tinctures, which would have greatly increased the usefulness of the table, forming a standard of quality to which reference could be made, but pressure

of other engagements compelled me to relinquish the task before it was completed.

A Table showing the Specific Gravities and Weights of certain Volume-measures of various Pharmaceutical Liquids.

Name of Liquid.	Specific Gravity.	Weight of 16 fl. oz.	Weight of 20 fl. oz.	Weight of 1 gallon = 10.
		oz. grs.	oz. grs.	lbs. oz. grs.
Æther. B.P.	0·735	11¾ 10	14 56	7 5¾
Æther. purus, B.P. . .	0·720	11½ 14	14 29	6 14½ 31
Sp. æther. sulph. . .	0·809	12½ 94	—	7 15 66
,, chloroform . . .	0·871	13⅜ 87	17½ 90	8 11½ 105
,, æther. nitros. . .	0·845	13½ 15	16¾ 81	8 7½ 41
,, ammon. co., B.P. .	0·870	13⅜ 80	17½ 80	8 11½ 34
,, ,, P.L. .	0·918	14½ 87	17½ 63	8 12 67
,, vini rect.	0·838	13¼ 70	16½ 38	8 6 44
,, tenuior	0·920	14½ 3	18 12	9 1 30
Chloroformum. . . .	1·497	23⅜ 89	29¾ 77	14 5½ 16
Tinct. aconiti, B.P. . .	0·855	13½ 70	17 52	
,, ,, P.L. . .	0·859	13½ 90	17 84	8 12
,, cantharid. . . .	0·924	14⅜ 13	18½ 8	9 4 60
,, cardam. co. . .	0·954	15¾ ...	19 60	9 13½
,, cinchon. flav. . .	0·937	15 20	18¾ ...	9 6½
,, cinchonæ co. . .	0·939	15 18	18¾ 20	9 6½
,, camphor. co. . .	0·923	14½ 95	18½ 90	9 3 76
,, digitalis . . .	0·938	15 ...	18¾ 24	9 6¼
,, ferri perchlor. .	1·0064	16 44	20 56	10 1
,, hyoscyami . .	0·937	15 20	18¾ 40	9 6
,, lobeliæ æth. . .	0·810	13⅜ 90	16 99	7 15½
,, opii	0·940	15 17	18¾ 54	9 6¾
,, rhœi	0·942	15 39	18 38	9 6¾ 60
Vin. ipecacuan. . . .	0·993	15¾ 74	19¾ 73	9 15 84
Dec. sarsæ co. conc. .	1·055	16⅜ 65	21⅜ 44	10 9
Syr. simplex	1·336	21¼ 57	26⅝ 30	13 5¾

The PRESIDENT said that the contents per ounce were coincident with the specific gravity; for instance, lemon juice, having a sp. gr. 1040, would contain 40 grains of citric acid per ounce, and so on, except in such cases as alum and sulphate of soda, where there is much water of crystallization. In those cases it would be half, or 20 grains per ounce.

Mr. REYNOLDS (Leeds) referred to the rule laid down by Dr. Roberts, of Manchester, in regard to urine. This was that, roughly speaking, the units and tens of the specific gravity, when compared with one thousand parts of water, represented the grains of sugar in an ounce of diabetic urine.

Dr. WATTS (London) referred to recent and other researches on the supposed porous condition of liquids, and the extent to which

anhydrous salts, which dissolved in liquids without increasing the bulk of those liquids, were considered to occupy an interstitial position in regard to the particles of which the liquids were composed.

CONCENTRATED COMPOUND DECOCTION OF SARSAPARILLA.

By Mr. F. M. Rimmington.

The preparation of sarsaparilla so long known in the trade as concentrated decoction of sarsaparilla has received less attention, perhaps, than any other galenical preparation at the hands of scientific pharmacists. No criteria have, to my knowledge, been given of what it should be; and, considering the large demand for it, there is ground for supposing that some samples are not quite all they should be. It is a preparation, too, that is not easily judged by the senses. Samples are sometimes met with of such intensely deep colour that suspicion is excited. Other samples appear to have a greater consistence, and sometimes the taste of licorice is stronger than it ought to be. Now, all these appearances may be fallacious; some data upon which to enable the mind to form a judgment are required. Sarsaparilla itself has nothing very distinctive in it. There are no alkaloids to estimate, and the only datum is the amount of extractive afforded by a given quantity of root. All this uncertainty I have experienced, and have attempted to fix a standard of comparison.

I assume, from my personal experience, that the specific gravity of a liquor made with good root, in the proportion of a pound to a pound of fluid and 10 per cent. of spirit, ought to have a gravity of from 1·045 to 1·055. But as the specific gravity alone is insufficient as a test, as it may be affected by several circumstances, but, taken in connection with the amount of extractive contained in a given volume, it is of some value. But as the amount of extract may be influenced by the addition of other extracts, and sometimes salts are added for the purpose of increasing the colour and amount of extractive; consequently, it is necessary to estimate the amount of ash. These three tests together will, I think, be a pretty good guide to the judgment as to the quality and purity of the article. I have been unable to obtain sufficient samples to make a long table, but the following, I think, are sufficient to show the value of the plan I suggest.

I may add that the decoction has always a strongly acid reaction, and effervesces with carbonates.

No.	Specific gravity.	Extract in 1 fl. oz.	Ash in ditto.	
1	1·055	64 grs.	10 grs.	
2		57 ,,	9·7 ,,	
3	1·027	50 ,,	9·0 ,,	
4	1·034	52 ,,	9·5 ,,	
5	1·017	33 ,,	7·5 ,,	
6	1·049	67 ,,	13·7 ,,	
7	1·048	64 ,,	}	The amount of ash not taken, the experiment being made before this paper was contemplated.
8	1·048	75 ,,	}	
9	1·010	34 ,,	}	

Bradford.

The PRESIDENT spoke as to the difficulty of obtaining the extract in a uniform state of dryness.

A MEMBER stated that common salt was used by some makers to preserve the essence and to reduce the amount of spirit.

Mr. GROVES (Weymouth) had found the deposit formed in the compound decoction to consist mainly of a compound of glycyrrhizin with acetic acid.

THE DINNER.

On Tuesday evening, after the first meeting of the Conference, the President and officers were entertained by the Local Committee at dinner, at the Adelphi Hotel. The Executive Officers present were:—Mr. W. W. Stoddart, F.C.S. F.G.S., Bristol, the President. Mr. H. C. Baildon, Edinburgh; Mr. H. S. Evans, F.C.S., London; Mr. J. Ince, F.L.S., F.C.S, London, Vice-Presidents. Mr. H. B. Brady, F.L.S., F.C.S., Newcastle-on-Tyne, Treasurer. Professor Attfield, Ph.D., F.C.S., London; and Mr. R. Reynolds, F.C.S., Leeds, General Secretaries. Mr. E. Davies, F.C.S., Secretary for Liverpool. Mr. T. Dutton, Secretary for Birkenhead. Committee: Messrs. F. F. B. Benger, Manchester; S. C. Betty, London; M. Carteighe, F.C.S., London; T. B. Groves, F.C.S., Weymouth; W. Martindale, F.C.S., London; J. F. Robinson, Liverpool; and F. Sutton, F.C.S., Norwich. The Local Committee for Liverpool consisted of Mr. J. Abraham, Chairman; Mr. R. Sumner, Vice-Chairman; Mr. J. Shaw, Treasurer; Messrs. H. S. Alpass; G. Barber; T. Brittain, J. M. Buck; H. Coupland; F. D. Delf; T. Dod; E. Evans, sen.; W. J.

Foulkes; A. T. Horton; W. Jarvis; S. Johnson; C. Jones; A. H. Mason; T. Martin; M. Murphy; J. Pendlebury; A. Redford; C. Sharp; J. Thompson; and J. Woodcock. Mr. J. Abraham occupied the chair, Mr. R. Sumner the vice-chair, and the party numbered upwards of one hundred.

The CHAIRMAN, after the loyal toasts had been honoured, referred to the American Pharmaceutical Association, now holding its nineteenth sitting in the city of Baltimore. It had been suggested to him that they should send a message of friendly greeting to their friends in the West, as under:—"From the President of the British Pharmaceutical Conference, at Liverpool, to the President of the American Pharmaceutical Association, at Baltimore. The most successful meeting ever held, sends hearty fraternal greetings." He then proposed the toast of the evening. That meeting was, he said, the seventh of the British Pharmaceutical Conference. It was an infant which had already, in seven years, grown up to be a giant; and it was so ably represented here that it needed no commendation from him. The very able address delivered that morning by the President, Mr. Stoddart, he was sure well deserved the warmest encomiums he could bestow upon it, and he only wished that any praise of his was better worth receiving. He was sure they would drink with the heartiest goodwill, "The success of the British Pharmaceutical Conference, and the health of Mr. Stoddart, its President."

Mr. STODDART, who was much cheered, said he returned his sincere thanks for the honour just done him in connecting his name with that of the Pharmaceutical Conference of Great Britain, and, as its President, an honour to which he never thought to aspire. It was with the greatest affection and love that he had seen the society grow as it had. What he had done for its progress had sprung from a liking for it. It was one of the most useful institutions; and it had done more good, both directly and indirectly, than any ever established for the furtherance of their interest for many a long year. He did not expect to see, in his time, the total benefit capable of being derived from the institution; but he looked forward with much pleasure, prophetically speaking, to the incalculable benefits which the younger members of the society would derive. The advice given by the older members was offered with hearty good will, and for the welfare of the younger members. The time would come when they would be thankful for the days when the British Pharmaceutical Conference had sprung from the ideas of a few at Newcastle-upon-Tyne, followed as it had been by

the meeting at Bath, and those which had annually succeeded it, down to the Conference at Liverpool.

Mr. R. SUMNER proposed "Prosperity to the Pharmaceutical Society," and associated with the toast the name of Mr. Sandford, the President of the Society.

Mr. SANDFORD, in response, said the business of the Conference should be pharmacy, pure and proper. The society had other business in which that Conference could help it. It had the duty of advancing pharmaceutical education, and he hoped it had not neglected that duty, and that the time might come when it might do it more extensively than it had done hitherto—when it might support pharmaceutical schools, not only in London, but in the country. It would be the endeavour of the society to carry out faithfully the duties put upon it by the Government. The members had the matter in their own hands, and so long as they used their powers properly they would have the support of the Government. The Conference had it in its power to promote that very much. To the Conference a great deal might be due for the passing of the Pharmacy Act. It was, therefore, with great pleasure that he had heard the chairman speak so highly of the Pharmaceutical Society. As for himself, he returned thanks for personal kindness and he hoped the Conference would long continue to be the prosperous body it now seemed.

Professor ATTFIELD proposed "Success to the Liverpool Chemists' Association," one of the most important associations of the kind throughout the country. In 1849, Jacob Bell came to Liverpool to urge the claims of the Pharmaceutical Society, and one of the results of his visit was the formation of the Liverpool Chemists' Association. The present meeting therefore witnessed the "majority" of the association. Jacob Bell characterised Liverpool as "a collection of men than whom there was none in the country having a greater amount of public spirit and energy." The same public spirit had characterised the chemists and druggists of Liverpool from that time to the present. In the index to the *Pharmaceutical Journal*, would be seen column after column of titles of lectures and papers contributed from Liverpool, and the character of the papers was scarcely excelled by that of any contributed to the parent society in London. The success of the present Conference showed that the like energy was still characteristic of the Liverpool pharmacists.

Mr. J. F. ROBINSON and Mr. J. SHAW responded.

Mr. A. BEDFORD proposed "The Officers of the Conference," coupled with the names of Mr. Brady, Mr. Reynolds, and Professor Attfield.

Mr. BRADY expressed his regret that after seven years' duty he felt compelled to resign the office of treasurer, but he hoped that the Conference would not suffer, and that there would be no difficulty in finding a successor.

Mr. REYNOLDS and Professor ATTFIELD also replied.

Mr. STODDART acknowledged "the glorious reception" which the Conference had met with at the hands of the people of Liverpool, and proposed "The Local Committee," coupled with the names of Mr. E. Davies and Mr. Mason.

Mr. E. DAVIES and Mr. A. H. MASON responded, and expressed their gratification that their efforts in connection with the exhibition had met with such approval.

The CHAIRMAN announced that, although he was surrounded by the most brilliant array of pharmaceutical talent ever assembled in the provinces, he had received letters of apology from Mr. Henry Deane, Mr. Daniel Hanbury, Professor Bentley, Mr. Hills, Mr. Schacht, Mr. Cooper (of Exeter), and other prominent members of the Conference. He proposed "The Visitors."

Mr. GROVES, of Weymouth, and Mr. MACKAY, of Edinburgh, responded.

Mr. R. SUMNER proposed "Professor Archer, of Edinburgh," whose health was received with much applause.

The toast of "The Pharmaceutical Press," coupled with the names of Dr. Paul, editor of the *Pharmaceutical Journal*, Mr. Brough, editor of the *Conference Year-Book*, and Mr. Wootton, editor of the *Chemist and Druggist*, together with other toasts, followed before the party separated.

SECOND SITTING.

Wednesday, September 14th.

The Conference reassembled at 10 a.m. The spacious lecture theatre of the Royal Institution again exhibited a numerous attendance throughout the day.

At the commencement of the proceedings, Professor ATTFIELD announced that an answer had been received from the American Pharmaceutical Association, in conference at Baltimore, to the telegram sent the previous evening across the Atlantic from the President of the Conference during the dinner at the Adelphi Hotel. It was as follows:—"From Professor Maisch, Baltimore, to Secre-

tary of Pharmaceutical Conference, Liverpool,—Fraternal greeting of American Pharmaceutical Association." (Cheers.)*

RECEPTION OF LETTERS OF INVITATION TO THE CONFERENCE FOR 1871.

Mr. BRADY informed the Conference that the meeting of the General Committee of the British Association had just decided to make some important alterations in its future procedure as to towns to be visited. It had been determined to fix the place of meeting two years beforehand, which would give more time for making local arrangements. Of course, this alteration had a special interest for the Conference.

The PRESIDENT then called for any invitations to the Conference to hold its meeting next year.

Professor ATTFIELD read the following communication from Glasgow :—

"*Glasgow, Sept. 10th,* 1870.

"Dear Sir,—Anticipating that the members of the British Pharmaceutical Conference will honour this city with their presence next year, the Committee of the Glasgow Chemists and Druggists' Association have desired me to express their gratification at the prospect of meeting those who are so well known in name among them, but whom they have as yet not had the pleasure of seeing here; and to state that, in the event of such being agreed upon, they will be prepared to give them a hearty welcome, and be most happy to co-operate with and assist them in making the necessary arrangements.

"I am, dear Sir, yours respectfully,

"JAMES S. FAIRLIE,

"*Sec. G. C. and D. Assoc.*"

"*To Dr. John Attfield,*

"*Sec. of the British Pharmaceutical Conference,*

"*Adelphi Hotel, Liverpool.*"

Mr. W. D. SAVAGE said that at a meeting of the Chemists and Druggists' Association of Brighton, it was resolved that the mayor (A. H. Cox, Esq.) and himself should appear at that meeting as delegates to convey to the Conference an invitation to visit Brighton. He regretted that his worship the mayor was unavoidbly prevented

* It will be interesting to readers to know that neither telegram was an answer to the other; but that each was despatched spontaneously, and almost at the same moment.

being present, but he assured the Conference that, if it visited Brighton, it would have a hearty welcome. The wishes of the chemists of the town had been made public in the following announcement, which appeared in the Brighton papers of August 30th:—"At a meeting of the Chemists and Druggists' Association, held in the mayor's room on Friday last, S. A. Brew, Esq., in the chair, it was unanimously resolved to invite the members of the Pharmaceutical Conference to come to Brighton next year, or whenever the British Association favours us with a visit; and his worship the mayor (A. H. Cox, Esq.) and W. D. Savage, Esq., were delegated to convey the invitation."

Mr. BAILDON (Vice-President) rose to convey, on behalf of Edinburgh, the message of invitation to the Conference with which he and his fellow-delegates were charged. He did not know if the British Association would select Edinburgh for its meeting in 1871, but he could promise the Conference that whenever it visited that city, it would receive a hearty welcome, and that everything would be done for the convenience and gratification of its members.

Mr. MACKAY cordially seconded his friend Mr. Baildon's representation of the feeling of chemists of Edinburgh.

The PRESIDENT expressed his sense of the honour done to the Conference by the invitations now received, and stated that, in accordance with the usual custom, the decision upon the place of meeting would for this year be postponed until a final meeting, to be held on the following Tuesday.

DISCUSSION ON FACILITIES FOR PHARMACEUTICAL EDUCATION IN THE PROVINCES.

Mr. REYNOLDS read the following communication received from the Secretary of the Pharmaceutical Society:—

"At a meeting of the Council of the Pharmaceutical Society, held on the 7th September, 1870, it was resolved,

"That a copy of the following resolution of the Provincial Education Committee be forwarded to the General Secretaries of the British Pharmaceutical Conference:—

"*Copy of Resolution.*

"This Committee recommend that the Council invite the British Pharmaceutical Conference to bring forward the question of Provincial Education for discussion at its meeting at Liver-

pool, in September, which would give an opportunity for the interchange of opinion amongst those best acquainted with the question."

The PRESIDENT expressed his great regret that his friend Mr. Schacht was unavoidably prevented from being present. It was very much to Mr Schacht's earnest interest in the question of Provincial Education that its present prominent position was due. They were, however, fortunate in having amongst them the President of the Pharmaceutical Society, Mr. G. W. Sandford, and he would invite that gentleman to favour the meeting with any remarks which he might be disposed to make. He was glad to refer the meeting to the proof-sheets of a return on Provincial Education from 1868 to 1870, obtained by the Pharmaceutical Society, a supply of which had been forwarded for the use of those present.

The President of the Pharmaceutical Society, Mr. SANDFORD, said that in responding to the invitation made by his friend, Mr. Stoddart, he felt that his own position there, during the present discussion, ought rather to be that of a listener than a speaker. The meeting would understand that some reticence was a duty in connection with his official position, since he could not lay down any special line of policy as having been agreed upon by the society which he had the honour to represent. At the same time, he made no secret of his personal wish to promote pharmaceutical education in the provinces. It was impossible to ignore the fact that under the present transitional system, there were many masters who would not—he should hardly be wrong in saying could not—teach their apprentices the essentials of their duties in connection with pharmacy. Where, then, should this want be supplied? It was not to be expected that all young men could afford the means necessary to come up to Bloomsbury Square, and avail themselves of its curriculum, but if proper means were provided in the provinces, there would be no difficulty in young men fitting themselves to pass the minor examination very soon after completing their apprenticeship. When the Pharmaceutical Society was first established, one of its earliest proceedings was to open a school of pharmacy, accessible to young men at a very slight cost. It was by carrying on that sort of expenditure for a few years that the society could help pharmaceutical education. "Providence helps those who help themselves," and the society should only help those who were inclined to help themselves. Some persons suggested rewards for passing good examinations; others wanted something to go on with at the beginning. The society wanted to encourage the schools which would send up

lads for examination, and should in a moderate way give grants where there were lectures established and a sufficient number of pupils to warrant the grant. Some candidates came up from employers who had taught them so well that they were able to pass their examination without going into the society's laboratory at all.

Mr. W. D. SAVAGE (Brighton) said he had had thirty-eight years' experience of apprentices, and his opinion was that if they were afforded opportunities for study there would soon be a better class of assistants.

Mr. H. S. ALPASS (Liverpool) said the difficulty was to find apprentices with a sufficient preliminary education to begin with. They had not a proper knowledge of Latin, and their general knowledge was defective.

Mr. SANDFORD remarked that the difficulty would be obviated if masters would agree only to take apprentices who had passed the preliminary examination of the Pharmaceutical Society.

Mr. F. B. BENGER (Manchester) urged that there should be assistance afforded in scientific education during apprenticeship; and that there should be a special technical school which would give instruction in sound elementary knowledge of chemistry, botany, and materia medica.

Mr. ABRAHAM (Liverpool), in reply to a question, said that for the last twenty years the Liverpool Chemists' Association had provided classes and lectures free to the apprentices, but the number of pupils had been and still remained extremely small. But he quite expected that the stringent changes already effected in the state of the law permitting the practice of pharmacy would compel a much larger number to seek scientific instruction. The means provided in Liverpool had been ample,—good instruction in the classes and free lectures of the best character, yet they had been poorly attended; the apprentices and assistants to whom the opportunities had been offered either did not know their necessity, or they were unable or unwilling to take advantage of them. The lecturer on chemistry was Mr. Edward Davies, the secretary of the local committee of that Conference. He (Mr. Abraham) was anxious that the rudiments of chemistry should be taught in secondary schools for boys, so that they might have the groundwork of the science before commencing their special technical training. That such a system was practicable had been convincingly shown in a large and excellent school at Liverpool, where about eighty boys had at once passed the Government examination in chemistry.

Mr. H. MATTHEWS, F.C.S. (London), said that as a former pupil

of the City of London School, he could not refrain from naming its early and earnest labours in promoting science-teaching. A sufficient number of years had now elapsed to judge of the fruit of such a system, and they found accordingly that amongst the old pupils of the City of London School the following well-known chemists could be ranked, viz., Messrs. Perkin, Bloxam, Spiller, Heaton, Divers, etc., whilst other departments of science included amongst their active workers the former students of the same school. It was unquestionable that the future tastes and pursuits of the man depended upon the bent given to them during boyhood.

Mr. E. Bremridge, Secretary and Registrar of the Pharmaceutical Society, said that most of the failures of students to pass the minor examination arose from deficient elementary education. He thought that masters should require every youth to pass the preliminary examination before he commenced his apprenticeship.

Mr. Mackay (Edinburgh) cited his own apprenticeship to show the extreme difficulty that formerly existed for study. When he was an apprentice he used to steal from his meals one hour for the study of pharmacy and another for materia medica. The system of apprenticeship in Scotland differed from that of England. The apprentice did not reside in the house, and his parents paid no premium; but, on the other hand, the employer paid a small salary, which might be progressive or not. About twenty years since, the chemists of Edinburgh mutually agreed that they would make it a condition of every apprentice's indenture that his friends should pay the fees for his attendance upon classes in chemistry and materia medica, the master covenanting at the same time to allow sufficient time. He and some other chemists in Edinburgh still adhered to this system. In Scotland now chemistry was being taught in most schools. It is also extended to ladies' schools. Physiology and chemistry were taught in the high school of Edinburgh, and a regular lecturer was appointed. There was, therefore, no excuse for lads going into the establishment of a chemist and druggist without passing the preliminary examination. The Pharmacy Act gave the pharmacists much power, and they ought not to take an apprentice without he could produce evidence that he had passed the preliminary examination of the Pharmaceutical Society—an examination not over-severe or over-strict.

Mr. H. C. Baildon (Edinburgh) confirmed the statements of the previous speaker, and concurred in his opinions.

Mr. A. T. Horton (Liverpool) referred to the limited attendance on the classes of the Liverpool Chemists' Association as described by

Mr. Abraham, and suggested that it might partly be accounted for by the fact that there were in the town many other classes for instruction in chemistry.

Mr. H. B. Brady (Newcastle-on-Tyne) wished to make a few remarks on preliminary education. Firstly, with reference to botany. It had been his intention, till quite a recent period, to have made a communication to that meeting on the *means* of teaching botany, supplementary in some measure to Mr. Schacht's paper of last year. Mr. Matthews had spoken of the importance of the bias given to the mind at an early age. This was eminently true of botany; and whilst they knew that at Professor Henslow's village schools, where the scientific teaching absorbed but an hour or two per week, girls of from ten to thirteen years of age acquired an excellent knowledge of English botany, it was monstrous to suppose that it presented any difficulties for pharmaceutical students. But *method* of teaching was a most important point. Let botany be regarded in the first place as a subject for observation rather than one of mere book definitions. The Sunday afternoon walk would yield material for study; but, if not, the student had a fair claim on his master for the small amount of time necessary for the purpose, and he did not believe it would ever be refused. Professor Oliver's "Elementary Lessons in Botany" would stand in the place of a teacher. As to the general question, and the modes of facilitating provincial education, he had last year given some account of what had been done at Newcastle, viz. the establishment of a chair of practical pharmacy in the university of Durham (the medical faculty of which has its head-quarters in Newcastle), and the institution of a distinct programme for students in pharmacy. Many present at that meeting had thrown doubt and distrust on the association of pharmaceutical with medical students, and it was gratifying to be able to report, on the authority of Mr. Freire-Marreco, the reader in chemistry, that so far as could be observed the arrangement worked in every way satisfactorily. He maintained that if the experiment should go on as satisfactorily as it had begun, it would, in their case at least, be a distinct waste of teaching power to separate the two classes of students. It was interesting to find that an arrangement almost exactly identical, even to the amount of fees demanded, was already in vogue at Chicago. Whilst they were calling upon medical men to refer to them in matters touching chemistry, materia medica, and the like, he (Mr. Brady) thought it absurd to fix a lower standard of education and shorter courses of lectures for pharmaceutical students than medical students themselves enjoyed.

Mr. SUTTON (Norwich) lamented the want of opportunities afforded for instruction in some districts. Norwich, for instance, did not yet possess the means of scientific instruction which Liverpool had. The remedy for the difficulty mentioned by Mr. Alpass was in the hands of the pharmacists themselves. He would not take an apprentice under sixteen years of age, and unless the youth was well educated.

Mr. EKIN (Bath) said he was surprised that no mention had been made of the Goverment scheme of education, which he thought would go far to get us out of our difficulties. The second-grade schools which were shortly to be established all over the kingdom would give just the education that was required. The scheme was to give a boy a thorough knowledge of his own language, to enable him to read Latin easily, and to give him a sound elementary knowledge of chemistry, botany, and physics. If only the Pharmaceutical Society would require in addition to the subjects now insisted upon at the preliminary examination a thorough elementary knowledge of chemistry, botany, and physics,—and by an elementary he by no means meant a superficial knowledge,—they would get just the class of pharmaceutical students they wanted. He did not believe in the science-teachers holding certificates from the Science and Art Department, who were for the most part men of deficient education, and who would entirely fail to command the respect of boys of the class from which pharmacists were taken; and he need hardly say that if boys had no respect for their teachers, they would get but little benefit from their teaching. If needs be, and until these second-grade schools, as they were called, were fairly established, technical schools, as recommended by his friend Mr. Benger, would fill up the void. But he thought they need not be under much concern about ways and means; only let the Pharmaceutical Society create the demand by their requirements at the preliminary examination, and the supply would quickly arrange itself.

Mr. SAVAGE (Brighton) suggested that in publishing the names of those who passed the minor examination, the names of the institutions where their education had been obtained might be added.

Mr. PAYNE (Wallingford) wished to call the attention of the meeting to the position of the pupils in small towns, where there were sufficient numbers to employ combination.

Mr. R. SUMNER (Liverpool) said that it had always been an opprobrium to their local Chemist's Association, that it received so little support from associates. He felt strongly upon the extensive and growing refusal of the larger establishments to receive appren-

tices,—a refusal which some of them even blazoned abroad, adopting as a motto, "No apprentices taken, and no arsenic kept on the premises." He held that this was an evil which required correction.

Mr. DYMOND (Birmingham) said that they need not be too anxious about young men availing themselves of the means of instruction. The legal position would now compel them to do this. For the subjects required by the preliminary examination, Government Science Classes might be looked to as valuable auxiliaries, and they saw how extensively such subjects as chemistry were being introduced into middle-class schools. Doubtless, much remained to be done, for whilst there were about 8000 chemists and druggists in Great Britain, he only found 245 students recorded in the returns on provincial education as attending classes in chemistry. He thought that they should appeal to the Government to aid such science teaching.

Mr. MARTINDALE (London) feared that the distribution of aid from the Pharmaceutical Society would produce local jealousies, and that the smaller towns would be neglected. He agreed with Mr. Ekin that the elements of chemistry and botany should be introduced into the preliminary examination. The School of Pharmacy at Bloomsbury Square had now spread over the country a large number of well-trained pharmacists, to whom we might look as competent teachers of materia medica.

Mr. ATHERTON (Nottingham) gave the experience of the Local Chemists' Association to which he belonged, and said that all the assistants and apprentices of the town had joined it. In the organization of lectures, it was desirable that they should be delivered by those who knew the exact requirements of the students of pharmacy, since a want of this knowledge on the part of medical or other lecturers had sometimes defeated the object of the course.

Mr. M. MURPHY (Liverpool) continued the discussion.

The PRESIDENT agreed with Mr. Alpass as to the importance of primary education, and regretted that the education of the present day was getting too superficial, the simple fact being that pupils neglected to learn how to spell. In the Crimean war many dispensers were thrown out because of their inability to spell even one-syllable words. Few persons who had not given special attention to this subject would credit the extent of the evil. He had examined a class of five boys, supposed to be prepared for the preliminary examination, and, upon dictating a sentence of words of one syllable, none of the boys made less than three mistakes in the spelling. It had long been a rule with him to give time for instruc-

tion to his assistants and apprentices. He wished to take that opportunity of commending to the notice of all their young men the admirable little work by Professor Oliver, entitled, "Lessons in Elementary Botany." The use of this text-book would afford a very delightful introduction to the science.

Mr. R. Reynolds (Leeds) could not allow the discussion to end without alluding to the facts disclosed by the printed return on provincial education, of which the proof-sheets were before the meeting. It appeared to him a hopeful circumstance that, in several towns, there was already provision for teaching some of the subjects required in the technical training of pharmacists. It was to the aid and extension of these existing means that they should look. He must specially allude to the experiment which had been made by the University of Durham, in connection with the College of Medicine at Newcastle-on-Tyne, where sixteen students had paid a fee of six guineas each for perpetual tickets to a full curriculum of pharmaceutical education. In the discussion of this subject last year, several members, including himself, had expressed doubts whether the affiliation of schools of pharmacy with those of medicine would be to the interest of the former. It was now placed on record by their friends in Newcastle, as the result of a year's trial, that no inconvenience had been found, and that they were perfectly satisfied with the arrangement. If this continued to be the case in the future, it would much simplify their task, since there were eight or nine other towns having schools of medicine, to which the system could be extended. He (Mr. Reynolds) hoped that they would not overlook the necessity for thoroughness in any system to which they gave their sanction. Now that a certain standard of professional training was required by law, students must be prepared to be thorough, and those providing the classes must not let their duties be performed in a *dilettante* spirit. It must be a serious part of the work of the day, and not merely depend on spare time.

A CENTURY OF OLD BOOKS RELATING TO PHARMACY AND KINDRED SUBJECTS.

By Joseph Ince,

Member of the Royal Society of Literature.

The design was to show at the Exhibition held in connection with the Conference one hundred volumes illustrative of the pharmacy of

the sixteenth and seventeenth centuries. Some of these were of great rarity and excellence. A few of the books were exhibited at the meeting, Mr. Ince briefly alluding to the more important.

The annotators were James Collins, Daniel Hanbury, A. F. Haselden, F. T. Marzials, John Moss, Richard Reynolds, W. A. Tilden, and Joseph Ince. The "century" of the reviews written by these gentlemen will be found in the report of the Exhibition appended to the present volume.

The Conference adjourned at 12.30 P.M.

The Conference reassembled at 2 P.M.

The PRESIDENT said it gave him great pleasure to introduce to the meeting one of their oldest members, who had often contributed valuable papers to their Proceedings, but who resided at so great a distance that they had not had his personal presence before. He alluded to Mr. Tichborne, Chemist to the Apothecaries' Hall of Ireland, who had come from Dublin to attend the meeting.

ON SULPHITE OF ZINC.

By CHARLES R. C. TICHBORNE, F.C.S., M.R.I.A.,

Chemist to the Apothecaries Hall, Ireland, etc.

The interest that attaches to the sulphites from a pharmaceutical point of view is increasing every day, and the following notice of the chemical and general properties of one of them will, I have no doubt, be of use. The sulphites are gradually creeping into favour with the medical profession. This is due probably more or less to the development of the germ theories and kindred views, for as regards the antiseptic properties of the sulphites there are no two opinions. The antiseptic power of the anhydride is perpetuated through all its salts, more or less modified by its solubility or decomposibility.

Having had occasion to prepare the sulphite of zinc, I was impressed with an opinion that it was one of those compounds that bid fair to become practically useful, and was therefore worthy of careful investigation.

Preparation.—Six ounces of sulphate of zinc and 5¼ ounces of sulphite of sodium were dissolved respectively in 6 and 10 ounces of distilled water, and poured together whilst hot. If necessary, the solutions should be filtered before mixing. The quantities are calculated after the following equation:—

$$Zn''SO_4;\ 7H_2O + Na_2SO_3;\ 7H_2O$$
$$= Zn'' + SO_3Na_2SO_4 + 14H_2O.$$

The salt is, as will be seen further on, practically insoluble, and this method of preparation is much better than dissolving carbonate of zinc in sulphurous acid. The salt does not immediately form whilst the mixed solutions are hot, but as they slowly cool it is deposited in needle-like prisms; these crystals are, when once formed, extremely insoluble in hot or cold water. As regards its purification, the mode simply consists in well stirring during the cooling, so as to get microscopic crystals. These are thrown upon a filter, and well washed with distilled water as long as the washings give any decided precipitate with chloride of barium in the presence of hydrochloric acid. The washing, however, always gives a minute precipitate, but the sulphate will not practically amount to an impurity of any importance, and it is this reaction that has evidently given the idea of a constant oxidation going on which is unlimited as regards its extent. The salt, when properly washed, is dried at 100° C. The yield is about 43.

Composition.—The following formulæ have been given by different authorities as the composition of this salt:—

Fordos and others, $ZnSO_3 2H_2O$.
Rammelsberg, $2(ZnSO_3)\ 5H_2O$.

There was evidently some discrepancy here, and it was therefore considered necessary to determine the actual composition.

The sulphite was finely powered and dried at 100° C. 1·237 gramme of the salt so prepared required 2090 grain-measures of the B. P. volumetric solution of iodine to colour the solution blue, mucilage of starch and a few drops of acid having been previously added. This gave 35·01 per cent. of anhydride as being present. Now, theory requires, for 2 molecules of water 35·35 per cent., therefore this is rather low, which is no doubt due to a trace of sulphate of zinc.

Air-dried sulphite, however, only consumed 2985 grain-measures of the decinormal solution, the weight taken being 1·918, which corresponds with the terhydrated salt. Thus, theory, $Zn''SO_3;\ 3H_2O$ would give 32·16 anhydride, practice gives 32·39. Sulphite which had been finely powdered, and submitted to the prolonged action of sulphuric action under a bell-glass, gave a similar result. We therefore see that the discrepancy observed in different authorities is easily accounted for; the composition of the salt varies according to the method by which it is dried. It is as follows:—

Dried in the air, or over sulphuric acid, $Zn''SO^3$; $3H_2O$.
Dried at 100° C. . . . . $Zn''SO^3$; $2H_2O$.

M. Fordos' formula is correct as long as the salt is dried at 100° C., but not unless this is the case; whilst Rammelsberg had evidently been operating upon a salt one molecule of water in which had been partially dissociated by heat. The terhydrated salt may be viewed as the normal compound, as it seems perfectly stable under ordinary circumstances.

General Properties and Stability.—Sulphite of zinc is very insoluble in water at the ordinary temperature. 500 grains of a saturated solution consumed 82·5 measures of the iodine solution, which represented ·164 per cent. of the hydrated salt. It crystallizes in semitransparent prismatic crystals, which are pellucid on recrystallization from sulphurous acid. It decolourizes a solution of iodine without being acidulated. One extraordinary property of the sulphite of zinc is its ready solubility in an excess of sulphurous acid. If washed, sulphurous anhydride is passed for some considerable time through 1 part of the salt suspended in about $3\frac{1}{2}$ parts of water. A solution is readily obtained containing about 20 per cent. of sulphite, and having a specific gravity sometimes as high as 1·240 to 1·245 at 15° C. 15 per cent. easily dissolves in the ordinary sulphurous acid of the Pharmacopœia.

When dry, neither the di- nor tri-hydrate suffers oxidation on exposure to the air. They are, contrary to what is stated in the books, perfectly stable salts; however, like most of the sulphites, when in solution they suffer a gradual but slow oxidation; and hence their antiseptic power. Thus a saturated solution of the sulphite when tested with the volumetric solution gave the following results,—in each experiment 500 grains were taken:—

Day of the Month.	*Grain Measures of Vol. Solution.*
8th	82·5
9th	66·
10th	50·
11th	25·
12th	10·

On the 15th the sulphurous acid had become converted into sulphuric. The saturated acid solution was diluted with water, and tried in a similar manner. The oxidation was not nearly so rapid, and at the expiration of fifteen days it had not lost ten per cent. of its strength. The *saturated* acid solution suffers very little change.

Uses in Pharmacy.—The composition of sulphite of zinc would naturally point to its therapeutic uses. It might be viewed as a

desiccant, antiseptic, astringent, and caustic (we are now speaking of its external applications). As regards the last its insolubility renders it so mild that it could be hardly considered under the head of a caustic at all, and more nearly approaches the desiccant, oxide of zinc, in this respect. Its antiseptic properties, like all the readily oxidizable sulphites, are well marked; nor is it, indeed, necessary for it to come in contact with acid secretions for its power, in this respect, to come into play. It has been tried in some of the hospitals, and well spoken of in many cases.*

The following formulæ may be suggested :—

Sulphite of Zinc Lotion.

℞ Finely powered sulphite of zinc . . . . 20 grains.
Distilled water . . . . . ℥xx.

Digest twenty-four hours, occasionally shaking, and then decant the clear solution for use. This lotion should be made as required.

This lotion will contain about ½ grain to the fluid ounce, and might be advantageously used as a cold-water dressing for wounds.

Acid Sulphite of Zinc Lotion.

℞ Powdered sulphite of zinc. . . . . 8 grains.
Sulphurous acid B. P. . . . . ℥i. fluid.

Mix, and when dissolved add

Distilled water . . . . . ℥i. ℥vij.

Sulphite of Zinc Ointment.

℞ Prepared lard . . . . . ℥vii.
Powdered sulphite of zinc dried at 100° C. . . ℥i.

Compound Sulphite of Zinc Ointment.

℞ Lard. . . . . ℥iiiss.
Oxide of Zinc . . . . . ℥iij.
Sulphite of Zinc . . . . . ℥i.

The above ointment has been found most useful as a mild desiccant and antiseptic ointment in skin diseases.

The PRESIDENT said the sulphites were coming into very general

* A medical friend, of considerable hospital experience, writes as follows :—"A lotion of the sulphite of zinc proved highly beneficial in a case of gonorrhœa, rapidly lessening the discharge, and causing but slight pain. From the rapidity of the change in the character of the discharge after each injection, it would appear as though it acted, not only as an astringent, but also as an antiseptic, causing decomposition in the pus with which it came in contact; and subsequently, in its chronic stage, an injection formed of 1 grain of sulphite to the ℥i., held in solution by a sufficient quantity of sulphurous acid, caused a complete cure, without pain or inconvenience. It requires further experience before pronouncing definitely on its merits; but there is sufficient evidence of its usefulness to warrant extensive trial

use, especially the lime, potash, and soda sulphites; and that one large mode of consumption was for brewing purposes, for making weak beers keep from turning sour in summer weather.

Mr. Cottrill (Shepton Mallet) said that in Somersetshire the use of bisulphite of lime for cider was very extensive.

Mr. Tichborne stated that bisulphite of lime was much used in the porter breweries of Dublin, and its preservative effect was undoubted. However it was open to the objection that some of the nitrogenous compounds of the porter united with the liberated sulphur, and when this porter was bottled a fetid gas was developed. This difficulty did not exist in the case of ale.

Professor Attfield remarked that the discussion of the paper by Mr. Tichborne had somewhat hung upon one of its bearings only, but beyond this they must recognise that the paper represented a large amount of able and laborious work, for which they were greatly indebted to the author.

THE FLAX LINTS OF COMMERCE UNDER THE MICROSCOPE.

By Thomas Greenish, F.R.M.S.

The introduction of machine-made lint, which dates from about 1847, has to a very great extent superseded that made by hand. The latter had many defects, and the former possesses many advantages. Machinery, by lowering the price of lint, has very much increased its consumption; but there still lingers in the minds of many persons the feeling that there is no lint like that made by hand, and also a suspicion that the so-called "flax-lints" contain a mixture of cotton, varying in the samples of different makers, but objectionable in all.

Just at the time when I was engaged on this subject a circumstance occurred which will serve to illustrate my remarks. A medical man called on me for some lint. I unrolled a packet of Taylor's Super A 1 flax lint. He objected to it, remarking that it was mixed with cotton, and also that the presence of cotton in lint de-

in other cases. It would, no doubt, make an excellent collyrium (without the acid) in purulent ophthalmia, and a stronger solution might be used in ulceration of the mouth and gums. The solution of 2 grains to ℥i. of the acid solution was tried with excellent results to lessen the fetor in a case of extreme suppuration from a burn. In skin diseases, especially those of a parasitic origin, sulphite of zinc would probably prove invaluable.

tracted from the value of the lint as a dressing for sores; and this was especially the case when applied to a blistered surface. Now here was a question of fact and also one of opinion; and to determine one at least of these—the presence of cotton, or otherwise, in samples of professedly flax lint—was the object I had in view, and I have thought that the subject possessed sufficient interest to justify me in bringing the results under your notice.

A difficulty met me at the outset. I had purposely discarded all "cotton lints,"—they did not come within the scope of my inquiry; and to examine every sample even of those labelled "flax lints," whether from wholesale houses or retail establishments, would occupy more than the limited time at my disposal, and be of no practical value, for the absence of the maker's name left no means of identification. Here, for instance, is a sample of lint. The packet had a very pretentious label—"Superfine Lint," etc. It does not profess to be flax, nor does it say that it is cotton, neither has it the maker's name. Its composition is about half cotton and half flax, and the same remark will apply to the linted surface. I have examined a good many samples labelled flax lints, from different sources, but shall illustrate this paper by reference to those of a few well-known makers.

No. 1 Sample.—I will commence with the lint to which objection was made, Taylor's Super A 1 Flax Lint. I certainly was somewhat startled to find that it did contain cotton. By taking a piece of this lint and detaching from it a few threads, without reference to any particular part, the presence of cotton may be detected; but when the sample is subjected to a more methodical investigation,—when, for instance, the warp is separated from the weft which crosses it at right angles, and they and the fluff on the surface are examined,—it is found that the "warp" consists of a yarn of loose linen fibre, the "weft" of a closely-twisted thread of cotton, and that the fluff on the surface contains no cotton whatever, being composed entirely of flax. I use the words "yarn" with reference to the flax warp, and "thread" to the cotton weft, to convey a tolerably correct idea of their relative size and condition in the fabric. A stray fibre of cotton may be found on the surface, but it is not there in any appreciable quantity. The cotton would appear to have its place and value in binding together, so to speak, the flax yarns; but it forms no part of the linted "pile," consequently all the fibres coming into contact with a wound are pure flax. It is just possible that the presence of a thin thread of cotton as a weft, may make the material lighter and more porous, and assist in producing a larger linted surface to a

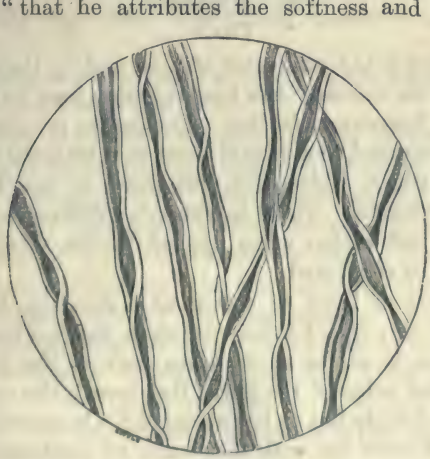
given weight of lint. The view adopted is probably borne out by reference to the next. I think, therefore, that we are justified in considering this sample as a flax lint.

No. 2 Sample is Maw's Ellesmere Lint, composed entirely of flax in warp and weft, and consequently the fibres of which the linted surface is composed have no mixture of cotton. It is a coarse lint as compared with some others.

No. 3 Sample is Robinson's, of Chesterfield, Flax Lint. Warp flax; weft cotton. Surface for the most part flax.

No. 4 Sample is hand-made lint, composed entirely of flax. It has very little fluff on the surface.

The second question may now be considered. Is the presence of cotton in any quantity really objectionable when forming part of the linted surface? It would be difficult for me by any direct experiment to determine this point. I must leave others to speak. I shall only quote one authority bearing directly on lint, and his remarks, I think, embody the opinions of most of those who have alluded to the subject. Erasmus Wilson, in his treatise on Healthy Skin, says, in substance, "that he attributes the softness and smoothness of

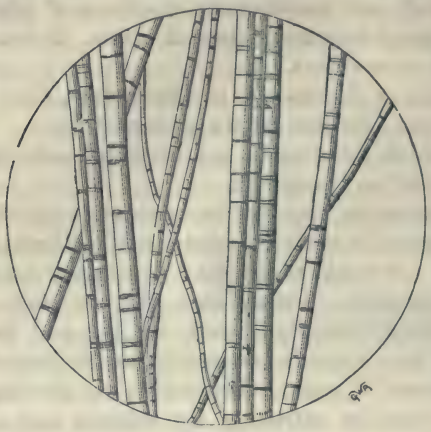


Cotton.

linen to the roundness and pliability of its fibre; the cold feeling to its being a good conductor of heat,—the porosity of its fibre rendering it very attractive of moisture, absorbing it freely, which, as water is a conductor of heat, removes it rapidly from the body." On the contrary, "cotton is a bad conductor of heat; it does not absorb moisture to conduct the heat away. It wants the freshness of linen; it is not, like linen, composed of fibres which are perfectly rounded, but, on the contrary, its fibres are flat, and have sharp edges, which

are apt, in delicate skins, to excite irritation. It is on this account that we carefully avoid the application of cotton to a graze or wound, and employ for such a purpose its softer and smoother rival, linen."

You will observe that his objections to cotton apply, in the first



Flax.*

place, to its being a bad conductor of heat, and, in the second, to the sharp edges of the cotton. His first objection may be valid, but the second has no foundation in fact. Cotton has no sharp edges; its fibre may be compared to a tube of some thin material collapsed, and with rounded edges, ribbon-like, but more or less twisted. The fibre of flax is rounded. There is certainly a difference in the feeling between linen and cotton when applied to the skin, to whatever cause this may be attributed.

The superiority of linen to cotton as a dressing for wounds is generally admitted; and I think, therefore, that we may accept as a fact that cotton, in so far as it forms part of the linted surface, detracts from the value of the lint. But how is the occasional preference for hand-made lint to be explained? On carefully comparing a piece of hand-made lint with that made by machinery, both being flax surfaces, I think it can only be a question of the relative quantity of "pile" on the surface of either sample; and a reference to the next lint would seem to support my views.

No. 5 Sample is "Charpie," a kind of lint used in the German hospitals, with reference to which I will quote a paragraph from one of the newspapers:—"*A Good Hint.*—'Charpie' is a game at which all ladies should now be playing. It is played in this way:—Tear

* The woodcuts represent the appearance of the fibres by transmitted light.

pieces of linen into fragments about three inches square, and draw out every thread separately. It is capital fun, especially adapted for the delicate fingers of young ladies, who can arrange parties for it at each other's houses; and the best of all is that this charpie—a kind of lint—is invaluable to the poor wounded soldiers, whose sufferings for the want of such a thing are often excruciating and intolerable." These detached threads are scraped into fluff, which is applied first, and then covered with the piece that remains, from which the threads have been drawn in one direction only.

No. 6 Sample is Marine Lint, which, through the necessities of the present time, has acquired some notice. For this sample I am indebted to the kindness of Mr. Martindale. In a letter to the *Lancet* of September 2nd, the maker says, "Marine lint is made from a variety of fibres (generally vegetable), prepared by a peculiar process, and will retain its disinfectant qualities and tarry fragrance for many years." I take a piece of this, and clean it by several immersions in methylated spirit. Its tar and its mystery disappear together. It is composed of flax or hemp fibres; in fact, it seems to me to be nothing more than "tow waste" passed through a solution of tar.

One word more as to the means adopted for the detection of cotton-fibre in combination with that of flax.

The microscope is perfectly efficient for this purpose. The value of polarised light in determining form and structure is well understood by the microscopist. I have availed myself of it in these investigations. By its aid, and with a little management in manipulation, every fibre of which the thread or fluff is composed, can be told with unerring accuracy. In the examination of a sample of lint, I would suggest that in the first place, a low power be employed to determine from the back of it the relative size of warp and weft, their closeness or otherwise; then that fibres from each and also a portion of the linted surface be examined separately by polarised light. By this means no specimen of lint can fail thorough investigation.

If I have succeeded in throwing any light upon and investing with interest the subject brought before you, my time in the investigations, and yours in listening to the results, will not have been spent in vain.

I have here for distribution some lithographic plates of cotton and flax under the microscope, kindly supplied me by Mr. Suffolk, F.R.M.S., to whom I am indebted for much information and many kind suggestions on this subject.

The PRESIDENT said that referring the different qualities of cotton and flax lints to the microscopic structure was an exaggeration and a popular error. If any difference really existed in their relative merits, which many doubt, it probably was not because one fibre was flat and the other round, but because the cotton twisted by being wetted by the moisture from the wound, and by its movement caused the irritation complained of.

Mr. INCE remarked upon the very different practice of this country and that of France and Germany in the selection of lint. In common with many others, he had lately given up a good deal of time to making charpie to send to the seat of war. In France, charpie, made by pulling out each separate thread of a linen or cotton fabric, was sold by weight. The French and Germans will not use English lint because of the fluff, and large quantities sent out for the relief of the wounded have been returned to England to be exchanged for other articles. The new material called "marine lint" was highly appreciated.

Mr. MARTINDALE referred favourably to the experience of "marine lint" in some of the London hospitals. As an antiseptic dressing,—a little loosely applied as a padding, placed above the ordinary lint dressing,—it had been found efficacious, especially in cases where there was much fetid discharge, of which it was a most effectual deodorizer. The surgeons at St. George's Hospital spoke well of it, having used it for some time, and at the University College Hospital it had been used with success. Its application was found to add much to the comfort of the patient by destroying the disagreeable odour which is often so persistent with gunshot and other wounds. It had been largely used for this purpose during the American war, where it was first introduced as a surgical appliance.

Mr. BAILDON regarded the prejudice against cotton lint as being without any good foundation, and stated that in the hospitals of Edinburgh cotton lint was used. As to the new "marine lint," carbolic acid was evidently its active agent.

THE FULMAR (*FULMARUS GLACIALIS*) AND FULMAR OIL.

By EDWARD C. C. STANFORD, F.C.S.

In the parish of Harris, Inverness-shire, nearly 200 miles from Inverness, and about forty-five miles west of the nearest point in

North Uist, 57° 50′ N. lat. and 8° 35′ W. long., is situated perhaps the most remarkable, certainly the loneliest, little village in Great Britain.

"St. Kilda's lonely isle" is seldom reached by strangers, and I therefore record briefly some impressions derived from a recent visit. There are several islands, one of which only, the south or main island, is inhabited.

Seen from North Uist on a very clear day, the main island has exactly the appearance of an enormous whale on the horizon, and the northern islands look like a huge sea-fortress with a tower on each side.

The north island, or island of Boreray, with its surroundings, is perhaps the boldest. We sighted this in the early morning looming through a dense mist, and quite close to the vessel. As the mist suddenly cleared away, a startling scene presented itself. A perpendicular rock, some 1000 feet in height sheer out of the Atlantic, towered above our heads. Its face, covered with lichens of every variety of colour, was gorgeously illuminated by the rising sun. It was flanked by two enormous rocky pillars 800 to 900 feet in height, one of which is beyond the perpendicular. This rock is an extraordinary sight; it is perfectly white from sea-line to summit, being completely covered with the white eggs, droppings, and feathers of an innumerable family of solan geese, which are said to keep this rock entirely to themselves. We astonished the winged inhabitants by a cannon-shot, but they repaid the astonishment with interest, for we were unprepared for the extraordinary effect of the myriads of wings which immediately hovered over and around us, and turned day into night.

St. Kilda proper lies about three miles south of Boreray. It may be described as a precipitous mountain ridge, which in some parts falls sheer into the sea, with enormous precipices some 1500 feet high. It is three miles long and two miles in its extreme breadth. It lies 50¼ miles due west of Schillay Island in the Sound of Harris. The formation is marked in Nicholl's geological map as greenstone with syenite veins. On the south-east side, the hill slopes down to a small open bay much exposed, and the landing is difficult. On this side of the hill the village is situated. About thirty houses, well built, and better roofed than is usual in the West Highlands, are occupied by about seventy inhabitants. The population does not increase, the infant mortality is large, and said to be peculiar to the island.

It is somewhat remarkable that the inhabitants are not fishermen,

but are all farmers and birdcatchers. Until quite recently, none of the men knew how to fish. The staple food of the island, is a bird called the fulmar, which forms the subject of this notice.

This bird is a species of petrel, the *Fulmar glacialis*, or *Procellaria glacialis* of Linnæus, the Fulmar petrel of Buffon, belonging to the family of *Procellarieæ*, order *Natatores*. At a distance, the bird might be mistaken for a gull, which it resembles in size and colour; it is more nearly allied, however, to the albatross, which it resembles in its remarkable bill, and its vomiting oil when attacked. The head, neck, and lower parts are pure white; the wings and back bluish-ash, and the bill bright yellow. The bill is stout and thick; the upper mandible considerably hooked at the tip, where it is also dilated and sulcated; the lower mandible is straight and slightly truncated. The nostrils are united in a single tube. A sharp claw on the legs takes the place of a hind toe. The flight of the bird is very beautiful, and it has a remarkably graceful movement of the head. The fulmar inhabits Polar regions, and, so far as I can ascertain, is unknown in any other of the outer Hebrides, and is found only on St. Kilda. It breeds enormously there in the rocks, laying a single large white egg, and the young is fed by the oily matter disgorged by the parents.

The strong bill enables them to extract oily matter, by perforating the skin of dead seals or whales.

In Newfoundland, they feed largely on the codfish offal, and probably they are experienced fishers everywhere.

The method of catching these birds, is peculiar to St. Kilda; the men may well call themselves birdcatchers, for assuredly there are none like them. The process seems simple enough, but the awful danger must be seen to be appreciated; indeed, the climbing propensities of these men would astonish any member of the Alpine Club.

Hanging on a rope (often made of heather) the birdcatcher descends the fearful precipices, armed with a sort of fishing-rod, having a slip noose at the end. This he dexterously throws over the head of the bird, which is sitting on a ledge of the rock beneath him, and hauls him up. He then dips the bird's beak into a small leather bag suspended to his waist, and there the oil is vomited. The bird is then killed and eaten as food, the feathers and the oil forming the two articles of export. Beds made of the feathers are said never to harbour insects, but it is alleged also that they are difficult to keep dry.

The oil is a good deal mixed with a rougher sort from Solan geese,

and realises a poor price as an ordinary rough fish-oil. The sample I exhibit, is genuine. It is of a clear, dark, slightly reddish sherry-colour, and has a powerful and peculiar odour,—an odour of which the whole island and all the inhabitants smell. It is certainly a fish-oil, and it possesses nearly all the properties of cod-liver oil.

Its specific gravity is midway between cod-liver and sperm.

Fulmar Oil, sp. gr.	·902
Cod-liver, light ,, ...	·924
,, brown ,, ...	·929
Sperm Oil ,, ...	·875

It is soluble in ether. Cold alcohol dissolves less than 1 per cent. and hot alcohol 3 per cent.

Treated with a drop of oil of vitriol, it produces precisely the same coloured reactions as cod-liver oil, which, if the generally-received views be correct, would show it to be a liver-oil.

It contains a very faint trace of iodine.

Heated with oil of vitriol and excess of potash, it gives off a strong odour of oil of rose.

Saponified with soda, the soap retains the peculiar odour, and yields a tolerably fluid fatty acid on acidifying the solution.

I shall be glad if this short notice of fulmar oil will induce any one to experiment with it for medicinal purposes. I have no doubt it might be obtained in quantity, and a good market would be a boon to that isolated people.

The specimen of fulmar exhibited, and which is offered to the Museum of the Pharmaceutical Society, was one of two that I had stuffed after keeping them alive for about a fortnight. It has suffered a little in appearance from its captivity.

The PRESIDENT expressed his interest in the singular facts laid before the meeting by their friend Mr. Stanford. The habits of birds included some phenomena which were startling by their uniformity and obedience to some hidden rule. Thus, the sea-birds frequenting the rocks near Tenby, were in the habit of appearing for the season upon a certain and uniform day each year.

Mr. GROVES, remarking upon the powerful odour of guano evolved by the stuffed specimen upon the table, said that the egg of the fulmar had also a strong smell.

A MEMBER referred to the recent Sea-birds Preservation Act, mentioning that the island of St. Kilda was specially exempted from its operation.

Mr. MACKAY stated that the deplorably destitute condition of the population of St. Kilda was ample justification for this exemption. Sea-birds and their eggs might be said to be the sole food of the people, who were often on the verge of starvation. Food was occasionally sent to the island, but sometimes the sea was so rough that no communication could take place for a period of months. He had understood that the skin of the bird was made into shoes.

A FEW NOTES ON ALOES.

By WILLIAM A. TILDEN, B.Sc. LOND., F.C.S.,

Demonstrator of Practical Chemistry to the Pharmaceutical Society.

In the list of subjects for investigation issued to the members of the Conference is the following question, No. 176:—"Compound Decoction of Aloes loses bitterness after some time: to what is this due?"

Before attempting to answer this question, a few points in the chemistry of aloes require notice.

In the last edition of Pereira's "Materia Medica," four proximate principles are enumerated as forming the most important constituents of aloes.

1. Aloetin, aloesin, amorphous aloin, bitter principle of aloes.
2. Crystallized or hydrated aloin.
3. Resin.
4. Aloesic acid; supposed by some to be gallic acid.

Experiments made by myself, in addition to those already published by Mr. Groves and other chemists, induce me to adopt an opinion respecting the constitution of aloes somewhat modified from the foregoing.

I. *Aloetin.*—The first of these bodies certainly forms a constituent, very important as to quantity, of all the varieties of aloes. There can be no doubt that it is the product of the alteration of crystallizable aloin, partly by the action of heat, partly by the oxidizing action of the air. I regard it as a mixture of anhydrous aloin, which is capable in the presence of water of recovering its crystalline condition, and the brown oxidized substance referred to further on.

II. Crystallizable *aloin* is the body to which especially all the varieties of aloes owe their bitterness. Its isolation is usually thought to be a matter of some difficulty, but the following simple process will furnish any desired quantity—pounds if necessary.

Select a specimen of Barbadoes aloes, the most powerfully odorous that can be procured, bright-looking, and not the most waxy: break it up and dissolve it in a quantity of boiling distilled water, to which a few drops of sulphuric, sulphurous, or hydrochloric acid have been added. The proportions employed may be those of the Pharmacopœia for Extractum Aloes, viz., one pound to a gallon. Let the liquid stand at night to deposit resin, then pour it off and evaporate quickly till, if 1 lb. of aloes have been used, about 2 lbs. of liquid remain.

This left for twenty-hours will deposit an abundant crop of yellow crystalline matter. The fluid portion poured off and duly concentrated yields a first-rate extract. The yellow crystals must be well drained and pressed, and will yield pure aloin by recrystallization once or twice from water mixed with a small proportion of rectified spirit. If the selection of the aloes be looked to, the product will amount to about 20 per cent. of the material employed.

Aloin has been said to be with great facility decomposed or altered by the simple application of heat to its aqueous or alcoholic solution. I have found, however, that it will bear, without appreciable change, comparatively rough treatment in this way, provided the solution is quite neutral or slightly acidified. A little pure aloin dissolved in distilled water may be evaporated to dryness and heated till it fuses, and then redissolved in water, and this operation repeated several times, but the aloin undergoes but slight change of colour, and will still crystallize on letting the solution stand for an hour or two, or almost immediately on stirring. The transparent yellow varnish left by evaporating solutions of it consists merely of anhydrous aloin; treatment with water restores to it its crystalline state. It is of course already known that if kept in a moist state on a water-bath for some time, the pure substance becomes gradually brown, and assumes the appearance of Socotrine aloes; but this is a comparatively slow process, and even after some time a considerable quantity of the aloin is still capable of crystallizing.

A further illustration of its stability is exhibited in the following experiment and accompanying specimen. About ten years ago, a paper by Kosmann appeared in the *Journal de Pharmacie*, the object of which was to show that aloes was a mixture of glucosidic bodies. The experiments by which grape sugar was obtained, and its presence indicated by the asserted production of alcohol and carbonic acid, were performed by Kosmann solely upon Cape aloes. I have made a number of experiments which convince me that he is quite incorrect in his statements, but as I hope

to reproduce the subject at a future meeting, I will cite only one experiment made with pure aloin. Some aloin was dissolved in about an equal weight of oil of vitriol (it forms a clear orange syrup); the solution was gently heated for a few minutes, and then poured into water and kept boiling for about four hours.

Saturated by excess of pure carbonate of barium, filtered and evaporated on a water-bath, a minute quantity of barium retained in solution precipitated by dilute sulphuric acid and the liquid further concentrated, unaltered aloin was deposited in yellow crystals. A part of the solution which had been thus treated was submitted to the fermentation test. Three tubes full of mercury were inverted in a small mercurial trough. Into the first was introduced some washed yeast and distilled water. Into the second some washed yeast and a weak solution of sugar. Into the third some yeast and the boiled solution of aloin. The first and third gave no bubbles of gas larger than a pin's head; the second tube was completely filled with CO_2 in half an hour.

To ascertain if the aloin prevented fermentation, two similar tubes were set up. The first contained yeast, distilled water, and sugar, the second had in addition a portion of the solution which had been boiled and tested as above. Both gave gas in about half an hour nearly equally. A portion of the same sample of yeast was used in all these cases. There is consequently no sugar produced by boiling aloin with acids, and the aloin undergoes practically no change.

The copper test is inapplicable, inasmuch as pure aloin which has undergone no manipulation reduces alkaline copper solutions rapidly and freely.*

Aloin gives no apparent change with tartar emetic nor with ferrous salts, but with ferric salts it strikes an olive colouration, which is destroyed by reducing agents.

III. The substance termed *resin*, which abounds in all kinds of aloes, is not very happily so called, for it is soluble in considerable quantity in hot water. It is said to yield chrysammic acid by treatment with nitric acid, and is therefore related in some way to the soluble part of aloes; but this is a point upon which nothing is known at present.

IV. There can be no doubt that the "aloesic acid," supposed to be present in aloes, has no existence. The reaction with iron salts,

* I have found that many other bodies besides the glucoses do this; amongst others, tannin and orcin.

ascribed to it is due to the crystallizable aloin, and the acidity to test-paper presented by an infusion of aloes is a property of the half-oxidized substance contained in the uncrystallizable "aloetin."

V. In addition to those bodies, there is in all aloes a small but notable proportion of vegetable albumen. It is left when either kind is exhausted with rectified spirit. Its presence probably promotes the change to which solutions of aloes are always subject.

Pure aloin, then, in pure solutions, is liable only to very tardy alteration. Exposed to the air, it gradually absorbs oxygen, and the solution deepens in colour; but the change, which is thus slow under such circumstances, is very rapid indeed if a small quantity of any alkali is introduced. The solution then becomes in a few hours of a deep brown colour; and after the lapse of three or four days, if the air be admitted, the aloin entirely disappears, and is transformed into a substance, or mixture of substances, which no longer possesses any bitterness, but is perfectly insipid. An experiment was made by dissolving pure aloin in water with an equal weight of carbonate of potassium; the solution, left in an imperfectly closed flask for about a week, entirely lost its bitter taste. Nitrate of barium was added to remove the carbonate, and the filtered liquid mixed with acetate of lead. The result was a dirty greenish precipitate, which was removed, and basic acetate of lead added. This gave a bright orange precipitate, which was collected and analysed. Its composition, compared with that of aloin, is shown by the subjoined numbers :—

Aloin (Stenhouse).		Yellow Precipitate.	
C	60·67	C	14·30
H	5·65	H	1·40
O	33·68	O	25·71
		Pb . . .	58·59
	100·00		100·00

From which it appears that, whilst in aloin the carbon stands to the oxygen nearly as 1 to $\frac{1}{2}$, in the oxidized substance it is, roughly speaking, in the proportion of 1 to 2.

Some extract of Socotrine aloes was boiled with carbonate of potash and water, in the proportion directed for the preparation of compound decoction of aloes, the remaining ingredients being omitted. Keeping this solution in the way described, it also became tasteless, and gave the same reactions.

Mr. William Young, pharmaceutical chemist, proposed the question which stands in the Conference list, and I am indebted to him

for the specimens upon the table, and also for his permission to quote from a letter with which he has favoured me.

He says, "For more than ten years I have observed that decoct. aloes co. loses its bitterness on keeping, but I cannot say that it loses its aperient property. I have frequently taken a fluid ounce of various degrees of bitterness, and have always found it produce the desired effect. But this is a matter which does not affect the pharmaceutist so much as the fact that the public cannot be persuaded that a medicine which is not uniform in taste is rightly prepared. I venture to assert, that if a customer were to purchase successively at one establishment four ounces of decoct. aloes co. weekly, and each sample being a week older than the one immediately preceding, no two samples would be alike. Of course if, as I understand is the custom in some large establishments, a large quantity is prepared and kept some weeks before use, a greater uniformity would be arrived at; but that puts the small tradesman at a great disadvantage, who perhaps prepares a pint at a time, and sends it out fresh and intensely bitter. I know an instance of a chemist who nearly lost a valuable customer in the following way. He had been in the habit of dispensing a ʒxij. mixture, containing ʒvj. vini aloes. When he first prepared it he had a pint of the vin. aloes in stock, which probably had been made five or six years, and had not the slightest taste of aloes in it, but it pleased the patient. At length the stock was exhausted, and the mixture prepared with a fresh supply of vin. aloes recently prepared. The patient could hardly be convinced that a mistake had not been made; and it was found that ʒss. of the recently-prepared vin. aloes imparted more bitterness to the ʒxij. mixture than the whole ʒvj. of the old. I have tasted samples of dec. aloes comp. concent. 1 to 3, almost devoid of bitterness; and a maker of that article informs me that it is a most unsatisfactory preparation."

The active constituent of aloes is still unknown. That the purgative property is not due to aloin was first shown by Robiquet, and is proved, I think, by the fact of its complete disuse after a very short trial. Mr. Young says that he has not noticed any variation of power in the specimens of different degrees of bitterness which he has tried; but, on the other hand, I have myself taken large doses of the oxidized alkaline solution of aloin, or of extract of aloes, without perceiving the slightest effect.

There is in Druitt's "Surgeon's Vade Mecum" a prescription which, I am informed by the author, is the most active form in which any kind of aloes can be administered. Barbadoes aloes is made

into a mass with strong sulphuric acid, and in that state rolled out into pills. Dispensing difficulties may have stood in the way of the more extensive employment of this form, but if it bears out the character attributed to it, it would seem that a half oxidized condition of the aloes is the most advantageous.

The questions which still remain to be solved with reference to aloes are numerous. Amongst others, two very important points seem to me to require examination. These are the nature and properties of the resinoid matter, and the cause of the differences between the several varieties of this important drug known to commerce.

The PRESIDENT said that the question discussed in Mr. Tilden's paper had very great interest. He felt surprised at the extent of the change which had been found to occur.

Postscript.—December 6th, 1870. I gladly avail myself of permission to add the following explanatory notes :—

1. All existing facts point to the conclusion that the various kinds of aloes do not owe their purgative action to the crystallizable aloin they may contain.

2. By exposing alkaline solutions of aloin or of aloes to the air, oxygen is absorbed rapidly, and the final result is a liquid which is no longer bitter. The products of this oxidation are also probably devoid of purgative properties.

3. Until new facts suggest a different conclusion, I hold that the soluble, brown, uncrystallizable substance, which constitutes a considerable proportion of all aloes, is the part to which the purgative power is due. W. A. T.

THE STORING OF POISONS.

By EDWARD SMITH, F.C.S.

One of the most important and interesting questions at the present moment on the pharmaceutical *tapis* is "the storing of poisons."

From the tone of the medical and general press, it is very evident that the public consider the Pharmacy Act to have thrown the onus of suggesting and providing efficient means to prevent "as far as possible the lamentable calamities from accidental poisoning which so often shock the public mind," on the Pharmaceutical Society, *i.e.*, practically on ourselves; and therefore, whether we agree with or differ from the reasons which induce the public to require this at

our hands, it is very clear that unless we set our house in order, and to the best of our abilities, provide some plan of storing poisons more in accordance with the wishes, and with some regard for the tender susceptibilities, of physic-takers, we shall presently find ourselves in an exceedingly unfortunate position, by having the power to act taken from us and placed in the hands of those who will turn a very deaf ear to any appeal or entreaties on our part. We shall probably find ourselves smarting under the imposition of unpractical and very irritating regulations, and possibly compelled even to submit our pharmacies to the indignity of inquisitorial supervision by government officials.

Without entering into the general question as to the desirability, necessity, or otherwise, of *any* poison regulations, it appears to me that at the somewhat peremptory demand of the public, either from within or without, must some action proceed; and surely there cannot be a shadow of a doubt in our minds as to who are the most competent to undertake the matter. Our business is one of such a varied character—a combination, as it were, of the elements of a profession, with trade as a basis—that we cannot contemplate the interference of an external authority without shuddering at the inevitable result.

If, then, we are best able to manage our business affairs, and provide our own laws and rules, the soundest policy and the truest wisdom dictate that we should lose no time in facing and grappling with this poison question, which already ripples the sea of public opinion, and which may, if we are not wise enough to calm the rising storm, ultimately swamp all our hopes of self-government, and possibly convert the Pharmacy Act into an instrument of grievous oppression. For these reasons, I now venture to bring the subject before you, in the earnest hope that some satisfactory proposition may be evolved from the discussion which may follow, and that as the fruit of your deliberations, the Pharmaceutical Council will be enabled to frame regulations, equally satisfactory to ourselves and to the general public.

When we come to consider the matter attentively, we soon discover there are two essential conditions on which every regulation must be based, viz., simplicity and elasticity.

Any complex arrangements would speedily break down, and collapse by their own inherent weakness. The first strain put upon them would create a state of things very much more conducive to an accident than the entire absence of all regulations. Indeed it is highly improbable that they would or could be carried out by the

majority of pharmacists, since it would entail an expenditure of time not often at the disposal of those engaged in business houses. Pharmacists are not, as a rule, in a position to retain the services of more assistants than they can fully employ; hence, during a press of business, either behind the dispensing counter or on a market-day, when perhaps scores of pounds of arsenic and other poisonous preparations are retailed over the counter, any but the very simplest regulation would, in point of fact, be ignored.

Whatever plan we decide upon must of necessity therefore be so simple that it will safely bear the many and varied exigencies of everyday practical work.

In addition to simplicity, there must also be elasticity; for not only have we to take charge of the few grains of atropia or aconitia, but also 7 lb. parcels of oxalic acid and the hundred-weight cask of arsenic. The same regulation should, if possible, cover every case.

Now, on reflection, it is clear that in addition to the care habitual to those who have the handling of poisons, we can frame regulations based upon either one or both of the senses of sight and touch. The former we have embodied in the use of blue poison bottles; the latter in the various angular and peculiarly-shaped bottles that have from time to time been suggested.

Hitherto, these ideas have only been carried out with regard to bottles, and it is really difficult to see how peculiarly-shaped parcels or casks can practically be used. I conceive we are compelled to fall back upon the sense of sight, which perhaps is the most acute of all our faculties, and the best for our purpose, seeing that it is the one most intimately connected with the brain and intellect. For these and other reasons I would therefore suggest that all bottles, packages, and casks, containing poisons, be of a dark blue colour. I fix upon blue simply because it has already to a certain extent been adopted by many pharmacists, and requires but very little extension to complete the system. From time immemorial Scheele's acid has been stored, with general satisfaction, in blue bottles, and possibly may have been the *fons et origo* of all blue poison-bottles.

There can be no difficulty in wrapping parcels of poisons in blue paper, nor in painting casks with blue paint. Shop bottles as well as stock bottles would of course follow the same rule, so that without any difficulty, and with a minimum of disturbance to existing arrangements, this simple plan might very readily be adopted. Of course every package must be distinctly labelled, and the word "poison" attached.

I object to alternative regulations, because they create confusion,

and, imperceptibly, lead to no distinct regulation whatever. Our assistants, who have mainly the handling of poisons, are not fixtures; they migrate from one place to another, and if at each pharmacy a different method of storing obtains,—the changes being rung, as it were, on alternative systems,—naturally enough the mind gradually loses its sensitiveness to the danger implied by these differing regulations, no distinct impression is retained capable of acting as a caution, and the inevitable result is confusion and insecurity, if not positive danger.

I see no great advantage in every pharmacist using the same shaped bottles; I would rather allow sufficient latitude in such minor considerations, so that a man may use his own discretion, and adapt his plan to suit the especial requirements of his pharmacy.

Neither do I agree with poison cupboards or other methods of isolation. They are at best but clumsy mechanical contrivances, and would in all probability fail to secure the smallest modicum of safety; but, on the contrary, rare and seldom used, but inoffensive preparations would be stored there as a place of safety, and thus render supremely dangerous the very place where security is supposed to reign triumphant. There seems to me, practically, to be far greater safety in the distinctively coloured poison bottles, dotted here and there on the shelves, than having them concentrated in some out-of-the-way and dismal corner of a cupboard or room; and not only because these individual dots appeal more distinctly to the mind through the eye, but also because we thus avoid the especial danger—a danger by no means to be disregarded—of using one poison for another. I conceive there is nearly as much danger in dispensing, say strychnine for morphia, as strychnine for James' powder; and, therefore, any plan of bringing powerful medicines together has in it an element of weakness which may easily eventuate in an accident.

It may be thought that simply to enclose all poisons in a blue or plain-coloured receptacle is, in reality, no precaution at all; undoubtedly not, unless the adoption is general and complete. But the Pharmaceutical Society has the power to make it a general and, therefore, efficient precaution. By the first clause of the Pharmacy Act, all pharmacists must conform to such regulations as to the keeping, etc., of poisons, as may be prescribed by the Pharmaceutical Society, with the consent of the privy council, and the twenty-sixth clause enacts that the name of any person who is convicted of any offence against the Act, may be erased from the register of pharmacists,—that is, deprived of the right of selling or keeping poisons;

and this power, invested in the society, is the fulcrum by which all of us may most effectually be compelled to carry out any simple regulation, such as the one proposed.

I have in this paper but very cursorily touched upon the more salient points of the question, my object being rather to provoke discussion than to dogmatize.

There is one consideration, however, which the Pharmaceutical Council must, in common justice to our profession, and out of regard to the public safety, not lose sight of. I refer to the expediency of *all* dispensers of medicine adopting the same system and conforming to the same regulation. Clearly enough it would be idle to enforce regulations upon us, if dispensing surgeons, who are said to dispense on an average more medicine, and, it has been said, poison more patients than pharmacists, should be still allowed unrestrictedly to keep and sell poisons. I do not mean that they should in any way become subject to the Pharmaceutical Council, but to their own governing body,—that is to the council of the College of Physicians or Surgeons, who should have the power to reprimand or suspend, according to circumstances.

The probable effect of this would be that many surgeons would be induced to give up dispensing, much to their own ultimate advantage, whilst pharmacists, being no longer deprived of their legitimate work, would gladly embrace the opportunity of giving up prescribing or encroaching in any way on the province of the medical man. I am sufficiently sanguine to believe that so very desirable a result will eventually be secured, having, as its ultimate effect, the creation of a feeling of perfect harmony and community of interests between the members of the medical and pharmaceutical professions.

A BETTER EXCIPIENT FOR THE OFFICIAL PILL-MASSES, AND FOR EXHIBITING SUBSTANCES GENERALLY IN A PILULAR FORM.

By W. Martindale, F.C.S.,

Dispenser and Teacher of Pharmacy to the University College Hospital.

The making of pills and pill-masses is such an every-day performance of the pharmacist, and, being one which requires a little dexterous manipulation, "the rapid and skilful preparation of them from all the numerous substances of which they are composed has

been justly considered to demand his highest qualification as a practical dispenser."*

The active medicaments which prescribers wish to administer in a pilular form vary very much in their physical and chemical characters; most frequently the bulk of the ingredients are powders, or substances capable of being reduced to the state of powder. In such, and indeed in all cases, the choice of a suitable excipient is of the greatest importance, both as regards the therapeutic action of the ingredients, and likewise its being adapted for the purpose of combining with them to form a firm plastic mass, which can be readily rolled out and divided into pills capable of retaining their globular form. To quote Dr. Redwood, the excipient should therefore be such as "will not be incompatible with any of the ingredients of the pills; will modify as little as possible their action, either by causing them to become hard, or in any other way; and will not unnecessarily or inconveniently increase their size."† For the sake of uniformity in dispensing, to the last condition there should, I think, be this marginal allowance, as small doses and active principles are now so much in vogue, that unless specially required, the active ingredients and excipient together in each pill should not, in any case, weigh less than one grain: that is, if, say, a quarter of a grain of hydrochlorate of morphia were ordered to be made into a pill, three-quarters of a grain of excipient should be used.

The excipients for pill-mass which are required to be kept as such —not moulded into pills at the time of making; the official pill-masses, for example—should, if possible, keep them in a plastic condition, or, at least, in such a state that they could readily be made to assume this condition again by beating up in a mortar, without any further addition of excipient being needed, as this would lessen the quantity of active ingredients contained in a given quantity of the mass.

I will briefly examine how far the excipients in general use fulfil the required conditions.

Confection of Hips.—This is directed to form sulphate of quinine into a mass in the official pilula quiniæ, and it is much used as an excipient for powdered crystallizable salts, and metallic powders generally; but it is unstable in its chemical character,—the sugar it contains becomes partially converted into grape sugar, and this being less soluble soon crystallizes. It therefore requires on some occasions much more of this excipient necessary for the purpose of

* Cooley's "Encyclopædia of Practical Receipts."

† Mohr and Redwood's "Practical Pharmacy."

forming a plastic mass, than at others. Unless very recently prepared, it is impossible to combine one part of it with three of sulphate of quinine into a mass which can be rolled and divided into pills, as is directed in the official pilula quiniæ.

Confection of Roses.—This confection, although it varies a little in consistency, is not liable to undergo the granular crystallization to which confection of hips is so prone. It is directed to be used as an excipient in eight out of the twenty official pill-masses, and with the exception of pilula aloes cum ferro, it makes masses which retain their plastic condition tolerably well. Its fault is, the quantity needed materially increases the bulk of the mass, for example, five-twelfths of its weight of the official mass of pilula aloes cum myrrha is composed of the excipient. Its bulkiness generally precludes its use as an extemporaneous excipient.

Treacle.—This is the excipient in five of the official pill-masses. It does not find favour with the dispenser, because it is so peculiarly viscid that when a little is taken from the bulk, there is apt to be formed a threadlike, attenuated attachment, which is not conducive to cleanliness. It is better adapted for making pill-masses in quantity than for extemporaneous dispensing, but it does not generally keep them in a plastic condition. About one-third of its weight of the compound rhubarb pill-mass is composed of this excipient, and even that quantity does not make a mass which, when kept, can readily be made to assume its plastic condition again. Simple syrup is sometimes used for vegetable powders, but it likewise forms a somewhat bulky excipient.

Hard Soap.—This is one of the excipients in seven of the official pill-masses. A little powdered soap is useful in reconciling an essential oil to an obstinate pill-mass, but on account of its chemical action its use should, as much as possible, be avoided. *Mucilage* is often used for extemporaneous work, but pills made up with it are apt to become very hard and insoluble,—in fact, with some fine metallic powders it forms a good cement. *Bread crumb* and *manna* are used for such substances as calomel. Those containing bread crumb, it is well known, get very hard when kept.

But where a somewhat fluid excipient is needed, the one which either alone or with some admixture finds most favour is *glycerine.* If there be any extractive matter among the active ingredients, such as there is in vegetable powders generally, it forms of it a ready solvent, and of the whole a plastic mass. But there is a great danger of adding too much of this excipient, in which case it oozes out to the surface of the pills after a time, and gives them an unsightly moist appear-

ance. To avoid this, it is generally mixed with one-third of its bulk of water or, better still, of rectified spirit. A little in this diluted state, kept in one of Chalk's drop bottles, flows more readily than the pure, and, if used in slight excess, the more volatile fluid evaporates; there is thus less likelihood of the surface of the pills becoming moist, but a mass of this kind does not keep sufficiently plastic. On account of its peculiar properties, for therapeutic reasons glycerine forms about the best general excipient for pills. In the pure state it is liable to change in itself. Its taste is agreeable, and excepting in a few instances with metallic salts, it produces no reaction more than mere solution of them, with non-metallic salts the same, but of these it is a much more general solvent, and its solvent and preservative action on vegetable substances generally is such, that a class of preparations of this kind has been suggested as substitutes for tinctures. When the vegetable ingredients of a pill are bulky (powdered rhubarb for example), less is required of it than of any other excipient. It has, too, the advantage of keeping them in a readily soluble condition, and by reason of its non-volatility, if a mass containing it should not remain plastic, it easily becomes so, without further addition of excipient, when "worked" in a mortar. But the disadvantage of the pills made with it becoming moist on their surface is a great drawback to its being generally used, I have, therefore, endeavoured to get some absorbent for this excess of moisture.

We used to have at the University College Hospital a general excipient for pills, which was then called *bread mass*. This was composed of a mixture of wheat flour, powdered soap, and treacle, beaten together; it did duty for confection of roses, confection of hips, and most other excipients, and generally did this well, as regards rapidity with which it would form substances into a suitable plastic condition for rolling into pills. But when required for such salts as calomel, corrosive sublimate, nitrate of silver, the sulphates of iron and copper, etc., these were decidedly incompatible with the soap it contained. Nevertheless, when I interdicted its use, I found we had need of something resembling it, as most frequently we get the excipient left to the option of the dispenser, and no other excipient in ordinary use was found so generally applicable as it had been. To obtain this desideratum, I first tried a mixture of *flour* and *glycerine*, but this, I was surprised to find, possessed little or no adhesiveness, very unlike the mixture of *flour* and *water*, of which the gluten contained in the flour forms such an adhesive paste; yet I found the flour was an excellent absorbent for the glycerine. I next tried various proportions of glycerine and flour heated together, to

form a jelly resembling glycerine of starch, but of firmer consistence. By stirring constantly and heating together until a temperature of about 240° F. is reached, five parts of glycerine by weight, and one part of flour, a firm adhesive paste is formed, which I call *glycerine mass.* As an excipient for vegetable powders it answers well, and for other substances on which it can exert a partially solvent action, it is eminently useful. Among these are such salts as valerianate of zinc, 4 grains with one of the glycerine mass, forms a good pill. Quinine, 3 parts, with 1 of the mass,—B. P. strength, —works well. Compound powder of ipecacuanha, 5 grains with ¾ of a grain of the mass makes a small pill. Oxide of zinc, too, 4 grains with 1 makes a good mass. But for most mineral and insoluble powders it is too moist, and will not form with them a firm mass; some additional absorbent is necessary, and for this purpose I found nothing better than the one I have before mentioned —flour; equal parts of the glycerine mass and flour form a tolerably firm, solid, adhesive paste, somewhat resembling dough, but it is not so elastic; this I *now* call *bread mass.* It possesses great capacity for the absorption of insoluble powders, such, for example, as calomel (3 grains with 1½ grain of this mass makes a good pill), nitrate and carbonate of bismuth, arsenic, etc. Of reduced iron, three parts with two of it form a good mass, in which the iron is not liable to oxidation. Carbonic acid, too, of which it is a good solvent, is readily made into a pill with the bread mass,—a little additional flour being necessary for this substance. Then again, substances that are given in minute doses, as the salts of morphia, resin of podophyllum and other active principles, to partially dilute their action, or where an excipient is needed to slightly increase the bulk of a pill, it is well adapted for use. And among the official pill masses, an equal quantity of it can with great advantage be used to supplant confection of roses in all these, with the exception of pilula aloes cum ferro, for which the glycerine mass is needed, and pilula ferri carbonatis, this too, requires the glycerine mass, with which it mixes well, but after a time the pills have a tendency to become moist. Mercurial pill I have not tried with it. The same quantity of this bread mass will replace the treacle in pilula scillæ composita. Equal parts of it and powdered soap in place of powdered soap alone (if this might be permitted), form a much better mass than the official one of pilula saponis composita. This pill mass, made strictly according to the British Pharmacopœia, soon becomes set into a condition resembling a piece of soap, in which state much beating is necessary to make it again plastic.

Of the glycerine mass to be added to the pharmacopœial quantities of—

Pil. Cambogiæ Comp. (*vice* syrup) 1 oz. makes a good mass.
„ Colocynth. Comp. (*vice* water) 3 dr. makes a good mass, and does not get so hard.
„ Hydrarg. Subchlor. Comp. (*vice* castor oil) 1½ oz. makes a good mass, but becomes slightly moist.
„ Ipecac. c. Scillæ (*vice* treacle), 1 oz. makes a good mass, which does not crumble.
„ Rhei Comp. (*vice* 4 oz. treacle) 2 oz. makes a good mass, and keeps tolerably plastic.

Among the other official pill-masses which I have not tried with these excipients are pilula colocynthidis et hyoscyami and pilula conii composita—these I find do not generally require any excipient—and pilula ferri iodidi, the starch contained in the flour with that would not form an elegant preparation.

Nitrate of silver is generally recommended in works on materia medica to be made into a pill with bread crumb, but this contains common salt, with which it is incompatible. I recommend the following formula, which is a modification of the bread mass:—

℞ Nitrate of silver . . . . . 6 grains.
Distilled water . . . . . 6 minims.

Dissolve and add:—

Glycerine mass . . . . . 12 grains.
Flour . . . . . 24 grains.

Mix to form a mass which may be divided into two-grain pills, each containing a quarter of a grain of nitrate of silver. The mass rolls out well. Keep them from exposure to the air and light.

For *perchloride of mercury* pills:—

℞ Perchloride of mercury . . . . . 6 grains.
Distilled water . . . . . 48 minims.

Heat in a test-tube till dissolved, and add it to

Glycerine mass . . . . . 48 grains.
Flour . . . . . 96 grains.

Mix well, and divide into 96 two-grain pills, each of which will contain a sixteenth of a grain of perchloride of mercury.

In recommending these excipients, glycerine mass and bread mass, for general use, I consider them therapeutically the best, but pharmaceutically they are not always so, as glycerine has some affinity for moisture, and pills containing it suffer if exposed to this in any way; a damp situation or a very humid state of the atmosphere will sometimes spoil the appearance of a batch of them. But in the use of these masses as excipients for the extemporaneous dispensing of pills, the utmost cleanliness may be observed, as they are not viscid or clammy, like treacle, syrup, or pure glycerine. They likewise keep

pills more plastic than the other excipients used, and they are more neutral in their chemical action than those in general use.

Substances like nitrate of silver and perchloride of mercury, may form different combinations with the albuminoid principles contained in the flour, but in such state they will probably be quite as readily assimilated and have a similar medicinal action, as physiologists affirm that most metallic substances enter into the blood as albuminates. I have had some fear lest the gluten contained in the flour might favour some decomposition similar to fermentation, but such, from nearly two years' use of them, I have never yet seen take place: the glycerine seems to check anything of the kind. The crude gluten obtained in the moist condition from flour, I find is nearly entirely soluble in glycerine, the solution does not appear to undergo any change when kept.

Taking these points into consideration, and the fact that the masses I have suggested form economical excipients, and for hospitals, where some aquntity of these are needed and form an item in their expenditure, I think they may meet with some favour.

A mixture of glycerine and tragacanth is often used, and produces very similar results to those I have obtained from the glycerine mass. I have not had much experience with such a mixture, but I find it makes a more elastic paste, which is often a disadvantage, as it causes the pills to have a certain amount of springiness, and renders them difficult to form perfectly globular.

Glycerine of starch, or a mixture of glycerine of starch and flour, do not form such adhesive pastes as those I have used.

Phosphorus is sometimes ordered in a pilular form; and to exhibit it in that condition, oil of theobroma is a good excipient. One per cent. of phosphorus may be readily dissolved in this by the following process:—Having melted the oil contained in a wide-mouthed bottle placed in a water-bath, add the phosphorus, and partially closing the mouth of the bottle, heat till this too melts, and the temperature of the mixture becomes about 180° F. Then cork it tightly, and with a little brisk agitation, the phosphorus will dissolve almost immediately. Allow the fluid to cool and solidify; and having in this condition divided it into suitable lots for rolling, beat each in a mortar to render it plastic before applying it to the machine, and work off quickly. A three-grain pill will contain $\frac{1}{100}$ of a grain of phosphorus. They may be coated with a solution of sandarach in absolute alcohol in the following manner:—Place the pills in a covered pot, and pour upon them a few drops of the solution, agitate well, and turn them out upon a slab, separate them from each other

and allow them to dry in the air. This gives them a tolerably impervious coating. The process of coating may be repeated if necessary.

For dried sulphate of iron, of which a large quantity is sometimes ordered in a pill, I find syrup is the best excipient. No form of glycerine seems to answer well for this substance. The water in the syrup for a time appears to have more affinity for the sugar than it has to form water of crystallization for the sulphate, and a little syrup therefore keeps the mass plastic for a sufficient length of time, that it can easily be rolled into pills. Five grains of this substance can thus be made into a small pill.

In conclusion, you are well aware the task of pill-making is not always an easy one, as frequently substances are ordered together in a pill-mass which have great repulsion for each other: the dexterous reconciling of them brings into play much of the art of pharmacy.

NOTE ON HYDRARGYRUM C. CRETA.

By M. J. Ellwood.

A sample of hyd. c. creta sent out by a London firm came recently under my notice. Its black colour and exceedingly strong metallic taste at once attracted my attention, and aroused my curiosity as to its manufacture. I remember a paper being read at the Birmingham meeting, describing a new method for preparing blue pill, the mercury being obtained in a state of fine division by precipitation from mercuric chloride with stannous chloride. I have no doubt this grey powder was prepared by a similar process as regards the mercury. To ascertain the truth of my supposition, I prepared a small quantity of precipitated mercury, and mixed it in its moist state with the proper proportion of chalk, and dried with a gentle heat. The resulting powder resembled the original in colour and general appearance, but had not quite so strong a taste, probably owing to the precipitated mercury prepared by myself, having been very carefully washed from any traces of tin.

I send a sample of that prepared by myself, but regret to say that the original sample was destroyed; that sent, however, will give you a pretty accurate idea.

Since writing the above, I have referred to the discussion attendant on the reading of Mr. Benger's paper on "Blue Pill," and find that Mr. Brady remarked that the process alluded to *might* possibly answer for preparing grey powder. Some manufacturer evidently

took the hint at the time, for the bottle from which the sample was taken, was marked as received into stock in 1866, just one year after the Birmingham meeting.

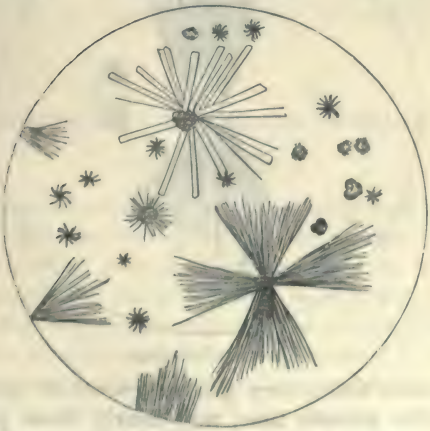
MICROSCOPIC EXAMINATION OF EXTRACTS MADE FROM OFFICIAL TINCTURES.

By M. J. Ellwood.

Messrs. Deane and Brady's interesting papers on "Microscopic Analysis applied to Pharmacy," induced me to repeat their experi-

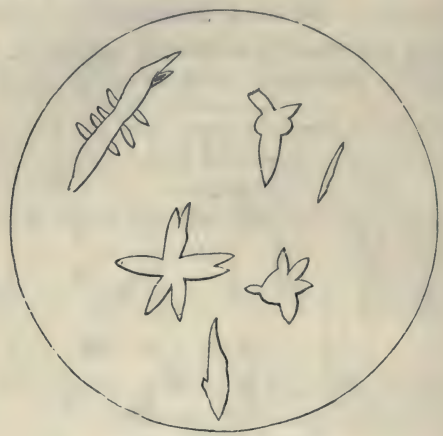


Tincture of Belladonna.

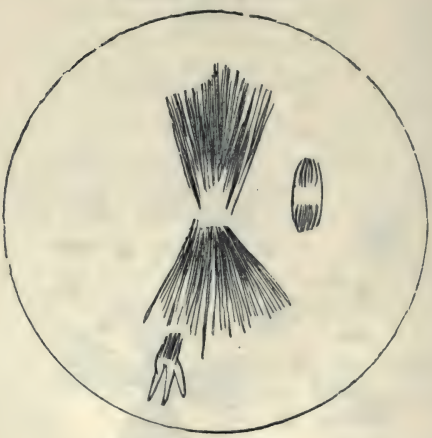


Purified Tincture of Opium (Brady and Deane's form).

ments on opium preparations, and afterwards to extend my researches to several of the official tinctures. I prepared slides of ten tinctures according to the plan recommended by Messrs. Deane and Brady; after a lapse of from two to eighteen months, and in two cases more than two years, crystals have appeared in tincture of belladonna, tincture of conium, tincture of digitalis, and purified tincture of opium (B. and D.'s form).



Tincture of Digitalis.



Tincture of Conium.

I may also state that a very gradual growth of crystals has continued up to the present time, now nearly three years since the experiments were made.

No appearance of crystals are observable, however, in tincture of cascarilla, tincture of buchu, simple tincture of cinchona, tincture of nux vomica, simple tincture of rhubarb, except in the case of tincture of pellitory, which is as yet doubtful.

I am not prepared to say what the crystals are, but the forms of some of them incline me to suspect oxalate of lime.



Aqueous Solution of Opium, after maceration in Ether.

One of my experiments with opium proved extremely interesting. I washed powdered opium with ether, and then made an aqueous extract of the residual powder, which soon produced on my slide magnificent feather-like crystals, but without any appearance of the prismatic crystals of narcotine, forming an excellent polariscope object.

LABORATORY NOTES ON TURMERIC.

By James Cooke.

Although but a short time has passed since my becoming a member of the British Pharmaceutical Conference, yet the conviction that members of a society should all be contributors to the common welfare and prosperity, inclines me to send a few lines, through Joseph H. Richardson, even should they be only suggestive.

It is possible that few of the Pharmaceutical Conference have prepared or seen cheiranthine, a crystalline product of the wallflower petals. A small portion prepared by me some years ago will be sent with this, which may interest some not yet acquainted with it.

My principal object here is, however, not cheiranthine.

As brevity on such occasions as the present is important, a short communication must suffice.

Several vegetable products, but little examined as yet, have in years past and to the present time yielded interesting substances.

Indications of new bodies with basic properties in plants, British and foreign, of various natural orders, may readily be obtained by curious inquirers. Vegetable acids seem to receive less exact inquiry.

In recent experiments with turmeric, I have discovered a basic substance, which, separated by ammonia from its combinations with sulphuric and nitric acids, presents a finely granular semicrystalline precipitate, readily soluble in hydrochloric acid. This combination crystallizes in long prismatic crystals with oblique terminations. It is colourless, and much disposed to become opaque.

The nitrate crystallizes in very short prisms with a tendency to unite in pairs which, much magnified ($\frac{2}{3}$ object-glass), resembled the disposition of the two lobes of some anthers in the Gramineæ.

The sulphate also presents groups of long crystals, grouped in a stellate manner, opaque by prolonged drying in warm air. This salt is also colourless.

There were some indications of another base, resembling in some points that existing in calumba root. I say *that*, but, believing that there are at least two, mean the principle one.

The colouring matter is quite another product.

I have some intention of undertaking for another year, if health and leisure allow it, the examination of the salts of lithia, which I find noted in the desiderata.

Let me conclude by wishing success to the Conference, an organization which may prove very serviceable by carefully and earnestly encouraging working bees, and by putting in their way what is worth having in forthcoming Year-Books.

THE CHEMICAL CONSTITUTION OF SULPHURATED POTASH.

By John Watts, D.Sc. Lond.

The following paper contains an account of some experiments upon which I have been engaged during the last few months, in order to ascertain more directly the exact chemical composition of sulphurated potash.

Different chemical works give different and apparently, at first

sight, discrepant results respecting the reaction which ensues when a mixture of potassic carbonate and sulphur is submitted to fusion. By some, especially by those of high authority, it is asserted that the reaction takes place according to the following equation :—

$$4K_2CO_3 + 5S_2 = \underbrace{K_2SO_4}_{\text{Sulphate.}} + \underbrace{3K_2S_3}_{\text{Sulphide.}} + 4CO_2,$$

potassic sulphide and potassic sulphate being produced, while carbonic anhydride is evolved. By others it is stated that potassic hyposulphite is one of the products of the reaction, and that either sulphate is not produced at all, or the equation proceeds in two stages, thus :—

$$3K_2CO_3 + 4S_2 = \underbrace{K_2S_2O_3}_{\text{Hyposulphite.}} + 2K_2S_3 + 3CO_2.$$

$$\underbrace{4K_2S_2O_3}_{\text{Hyposulphite.}} = \underbrace{3K_2SO_4}_{\text{Sulphate.}} + \underbrace{K_2S_5}_{\text{Sulphide.}}$$

the hyposulphite being resolved into sulphate and sulphide when the temperature at which the fusion is conducted approaches ignition.

A few qualitative analyses of some samples of "sulphurated potash," prepared with varying molecular proportions of materials, immediately decided in favour of the latter equations; the presence of potassic hyposulphite in considerable proportion was readily established, while potassic sulphate was detected only in very small quantity, and in one sample disappeared altogether. It is well, perhaps, to mention that there is much difficulty in preparing a sample entirely free from sulphate, since if the heat employed be somewhat too high or too long continued, a proportion of sulphate is immediately formed at the expense of the hyposulphite present.

Being now enabled to calculate the percentage composition, I proceeded to the quantitative analysis of several commercial samples, to see how closely their percentage might agree with that which had been deduced from theoretical considerations. These samples were procured from some of the best wholesale houses, and fairly represent the article as met with in commerce. The analysis resolves itself into the quantitative separation of a mixture of potassic sulphide, hyposulphite, and sulphate, but the probable presence of potassic sulphite and potassic carbonate must not be ignored, since the former may be derived from incipient oxidation, and the latter may result from imperfect decomposition.

There are two methods of effecting the separation of sulphides

from hyposulphites and the higher oxacids of sulphur:—1. By adding to a solution of the salt in question a strongly ammoniacal solution of argentic nitrate, the sulphur existing as potassic sulphide is alone precipitated as argentic sulphide, while the remaining silver salts are retained in solution by the excess of ammonia present; the argentic sulphide is collected and washed, and the sulphur estimated either by oxidation or by reduction in a current of hydrogen. To another portion of the salt, solution of argentic nitrate is again added, omitting the previous admixture with ammonia,—argentic sulphide is precipitated as before, while at the same time the hyposulphite is resolved into a mixture of argentic sulphide and argentic sulphate; when the decomposition is complete, excess of ammonia is added, and the sulphide collected and estimated as before. The amount of sulphur corresponding to one-half of the hyposulphite present is then calculated, by deducting, from the total amount of sulphur found, the weight of sulphur as obtained in the first operation.

2. By *Werther's* method. Recently precipitated cadmic carbonate is added in excess to the solution to be analysed; double decomposition ensues, potassic carbonate formed, and cadmic sulphide precipitated; this latter is washed, oxidized with fuming nitric acid, and the sulphuric acid estimated as baric sulphate. The hyposulphite present is unaffected by cadmic carbonate, and consequently will be found undiminished in the filtrate, where it can be readily estimated by the usual decinormal iodine solution.

Werther's method is preferable to the first process for several reasons. The cadmic sulphide washes with great rapidity, since, like argentic chloride, it has a tendency to coagulate into small clots; moreover, it has no inclination to oxidize by exposure to the air. The substitution of a volumetric estimation in the case of the hyposulphite is likewise more expeditious, and in accuracy perhaps excels the gravimetric method. I give the actual analyses more in detail.

Estimation of the Sulphide.—About 1·5 gramme was dissolved in water, and excess of cadmic carbonate added. The reaction takes place almost instantaneously, without heat, and if the carbonate has been used in sufficient quantity, the cadmic sulphide separates perfectly. The sulphide was then collected on a filter, washed with hot distilled water and partially dried, then transferred to a small flask and oxidized with fuming nitric acid; the boiling was continued until the unoxidized sulphur had acquired a pure yellow colour, when the whole being allowed to cool, the sulphur was separated and weighed. The sulphuric acid formed was then estimated with baric chloride in the usual way.

Estimation of the Hyposulphite.—A volume of carbonic acid water was added to the filtrate from the cadmic sulphide precipitate, to convert the carbonates present into acid carbonates; decinormal iodine solution was then run in, till the blue colour appeared as indicated by starch paste. The value of the iodine solution being known as corresponding to crystallized sodic hyposulphite, the equivalent quantity of anhydrous potassic hyposulphite was readily calculated.

Estimation of the Sulphite.—But the estimation of the hyposulphite requires a correction, lest any of the iodine employed should have been consumed by sulphurous acid. The direct estimation of the SO_2 is based upon the fact that while iodine oxidizes hyposulphurous acid into tetrathionic acid, it converts sulphurous acid directly into sulphuric acid; therefore, by estimating the sulphuric acid so formed, we are enabled to calculate with facility the amount of suphurous acid from which it was derived. Further, the amount of sulphurous acid being known, the iodine required for its complete oxidation is known also; the weight of this latter being deducted from the total weight of iodine employed, the remainder represents correctly the proportion of iodine consumed by the hyposulphite.

In no single instance was any potassic sulphite detected in solution of sulphurated potash; the numbers obtained in the analyses after oxidation with iodine, always exactly corresponded with those yielded by the estimation of the sulphuric acid originally present.

Estimation of the Sulphate.—About seven grammes were dissolved in a small quantity of water, and the solution completely decomposed by addition of dilute hydrochloric acid. A gentle heat was applied to volatilize sulphuretted hydrogen and sulphurous gases. After filtering off and washing the precipitated sulphur, the sulphuric acid in the filtrate was estimated with baric chloride.

Estimation of the Carbonate.—6·5 grammes were dissolved in water, and directly precipitated with excess of baric chloride. The precipitate consisted of baric carbonate, sulphate, and a small quantity of the sparingly soluble hyposulphite; this was washed with distilled water, transferred to the usual carbonic anhydride apparatus, a little potassic chromate added to effect the oxidation of any hyposulphite which might chance to be present, and the carbonic anhydride determined by loss in the usual way.

Estimation of the Total Potassium.—Two grammes of the salt having been weighed in a porcelain crucible, the latter was very slowly and carefully brought to a red heat so as to decompose the hyposulphite, and at the same time convert nearly the whole of the sulphide present into sulphate. After allowing the crucible to cool slightly, a

few drops of nitric acid were added, and the whole evaporated to dryness. The subsequent addition of a drop of strong sulphuric acid, ensured the conversion of the whole of the salt into sulphate, and the excess of sulphuric acid being expelled by a red heat with the assistance of ammonic carbonate, the potassium was weighed in the form of sulphate.

I give the theoretical percentage composition of sulphurated potash, supposing it to be formed according to the equation—

$$3K_2CO_3 + 4S_2 = K_2S_2O_3 + 2K_2S_3 + 3CO_2,$$

but the Pharmacopœia orders a slight excess of potassic carbonate:—

Sulphur	35·68	in combination.
Potassium	29·00	
Pot. Hyposulph.	35·32	
	100·00	

The following are the results of the analysis of four distinct samples, A, B, C, D:—

A.	Sulphur	36·13	potassic sulphide.
	Potassium	25·28	
	Pot. Hyposulphite	38·32	
	,, Sulphate	0·87	
		100·60	
	Excess	·60	
		100·00	
B.	Sulphur	25·45	
	Potassium	17·21	
	Pot. Hyposulphite	21·56	
	,, Sulphate	3·38	
	,, Carbonate	32·72	
		100·32	
	Excess	·32	
		100·00	
C.	Sulphur	28·17	
	Potassium	22·65	
	Pot. Hyposulphite	38·00	
	,, Sulphate	2·34	
	,, Carbonate	7·50	
	Ferrous Sulphide	·92	
		99·58	
	Loss	·42	
		100·00	

D.	Sulphur	28·32
	Potassium	20·20
	Pot. Hyposulphite	31·82
	„ Sulphate	4·32
	„ Carbonate	14·09
	Ferrous Sulphide	1·00
		99·75
	Loss	·25
		100·00

Sample "A" has been very carefully prepared; it contains no carbonate, only a trace of sulphate, and the full percentage of sulphide. All the other samples contain carbonate, especially "B," which latter is a very indifferent preparation, containing not less than 32 per cent. of undecomposed carbonate, with a proportional decrease in the amount of sulphide.

The ratio of potassium to sulphur in potassic trisulphide is 78 of potassium to 96 of sulphur. In the foregoing analyses the ratio, as might be expected, is not quite so uniform, at the same time it is sufficiently so to show that the potassium exists in the salt principally as trisulphide admixed with a certain varying proportion of tetra or pentasulphide.

Ratio in A	78 to 111	Ratio in C	78 to 97
„ B	78 to 115	„ D	78 to 109

In sample "B," owing to the deficiency of potassium in combination with the sulphur, due to imperfect preparation, the ratio more nearly approaches tetrasulphide than trisulphide of potassium.

I append the analysis of one sample in which complete decomposition has taken place, owing to its having been kept for a period of about nine months in a bottle with an imperfectly-fitting stopper. As will be seen, the potassic sulphide has entirely disappeared, having been oxidized principally to hyposulphite and sulphate with separation of sulphur.

E.	Potassic Sulphate	18·06
	„ Hyposulphite	51·60
	Free Sulphur	15·42
	Ferrous Sulphide	1·73
	Potassic Carbonate	3·10
	Moisture	8.89
		98·81
	Loss	1·19
		100·00

Ferrous sulphide must be noticed as an impurity in several samples. In every case the ferrous sulphide formed a superficial coating upon one side only of the fragments; it is obvious that the salt when in fusion has been poured out upon an iron plate instead of upon a stone slab, and hence has contracted this objectionable contamination. When sulphurated potash is of yellow colour, or breaks with a yellow or orange fracture instead of a deep brown, it is almost certain that it contains a considerable amount of undecomposed carbonate. Specimen "B" shows this orange colour exceedingly well, and I have noticed it in several samples which I purposely prepared at a very low temperature. In carefully-prepared samples the colour varies very slightly indeed, being always of a rich mahogany brown tint, commonly described as liver-coloured. The colour may be seen in specimens A 1, B 1, which have been preserved from oxidation by enclosing them as soon as cold in bottles previously filled with coal-gas.

There is no difficulty in preparing sulphurated potash upon the small scale; indeed, since more care can be taken in its preparation, it is likely to prove a superior article. A quarter to half a pound of a mixture of 20 parts of *dry* potassic carbonate and $12\frac{1}{3}$ parts of sulphur are placed in a Florence flask, and carefully heated by a Bunsen burner. The mouth of the flask is to be stopped with a plug of cotton-wool; as soon as the contents commence to liquefy the flask must be gently agitated once or twice, and when effervesence has ceased, and the mixture perfectly fluid, the gas is withdrawn, and the whole allowed to cool for two hours. The flask is then broken, and the contents immediately transferred to a well-stoppered bottle. If the salt has not been permitted to become quite cold, it is not sufficiently brittle to be broken into pieces; and further, it then adheres so firmly to the glass that it is very difficult subsequently to remove it.

I have said that the reaction which occurs in preparing sulphurated potash is such that potassic sulphide and hyposulphite are produced, but that if the heat be increased the hyposulphite splits into pentasulphide and sulphate. It might be supposed at first sight that the percentage of sulphide would be increased by employing an elevated temperature, and possibly, if closed vessels were always used in its preparation, this might to some extent be the case; but it is impossible so to prepare it on the large scale; and when atmospheric oxygen obtains access to the mixture the decomposition of the hyposulphite proceeds differently, oxygen being absorbed, while sulphurous anhydride is given off.

$$2K_2S_2O_3 + 2O_3 = 2K_2SO + 2SO_2$$

Potassic sulphide also undergoes combustion when unduly heated, producing the same compounds as result from hyposulphite, consequently sulphurated potash containing a large amount of sulphate can only be regarded as a faulty preparation. It appears, however, that the error more generally lies in the opposite direction.

With respect to the test given in the Pharmacopœia, that three-fourths of its weight should be soluble in alcohol of 84 per cent., it appears that few samples will come up to this standard; nevertheless, if the salt contain only half its weight of potassic sulphide, it may fairly be considered as a good preparation.

NEPAUL ACONITE.*

By T. B. Groves.

It had been my intention to furnish the Conference with a general view of the recent researches of Professors Flückiger and Klebs, on the aconite bases, but for several reasons I now abstain from doing so. In the first place, Professor Flückiger has himself communicated to the *Pharmaceutical Journal* a *résumé* of his long and able paper, and secondly, poor Professor Klebs, to whom had been entrusted the physiological portion of the inquiry, having been prevented by illness from elaborating his notes on the termination of the experiments, has now been ordered to the front as a military surgeon, leaving his manuscripts unaccessible, and nothing further published respecting his labours than is to be found in Professor Flückiger's paper already alluded to. I much regret this delay, as I should attach the first importance to such method of testing in the case of substances so ill-defined chemically, so susceptible of modification in the process of extraction, and withal so immensely powerful in their action on the living body, as are the group of aconite alkaloids.

Flückiger's motive in undertaking his investigation was a desire to determine whether or no there were at the present time two different aconitinas supplied to the medical profession, and if so, in the second place to determine exactly their respective characteristics, and lastly, to ascertain the source from which each alkaloid was derived.

* Vide, p. 96. *Aconite Alkaloids.*

In the first and second parts of the subject, he was highly successful, and pharmaceutists are greatly indebted to him for establishing indubitably the fact that there are both aconitina and pseudaconitina. As regards the source of the latter, he regrets his inability to settle the moot question, whether it owes its origin to the Indian aconite roots known under the name of bikh, or not. Von Schroff early declared that such was the case, and that he had extracted from bikh roots an alkaloid he regarded as the acrid principle of aconite, as distinguished from the narcotic principle represented by German aconitina. But he unfortunately identified this acrid principle with Morson's aconitina, which substance Flückiger was able to prove identical with the German article, and moreover, that it for many years had not perceptibly altered its character. Flückiger's examination of bikh, limited to the physiological testing of an extract of that root, pointed to the conclusion that it contained aconitina, not pseudaconitina. It will be well here to read a summary of Flückiger's conclusions.

1. Aconitina is found in the roots of the European blue-flowered aconites, especially *A. Napellus*.

2. It is also found in the Himalayan species that go by the name of bikh, amongst which occurs *A. Napellus*, sp.

3. According to Hübschmann aconitina is wanting in *A. Lycoctonum*, the yellow-flowered aconite.

4. Aconitina is characterized by the following properties. It softens in boiling water, and imparts to phosphoric acid that has been concentrated by heating over a water-bath at from 80° to 100°, a violet tint that in the cold lasts for whole days. Its watery solution tastes bitter, not acrid. It is not precipitable by chloride of platinum. Soluble in 5 pts. sp. v. r. (75 p. c.), also soluble in ether and chloroform. It fuses completely at about 120°. Its nitrate crystallizes well, the free base not so distinctly.

5. The above description (par. 4) applies generally to English aconitina, except that occasionally an acrid taste accompanies the bitter.

6. Hence the term "English aconitina" is not distinctive.

7. There is found among the varieties of aconitina an entirely different basic body, of unknown origin. A conjecture may be hazarded that it is derived from the Indian bikh roots.

8. It is here referred to under the name pseudaconitina. Its discoverer, Von Schroff, however, called it English aconitina. Other chemists have termed it napellin, nepalin, acraconitina.

9. Pseudaconitina does not soften in boiling water, does not give

the violet colour with phosphoric acid, tastes acrid not bitter, does not dissolve in water, is little soluble in ether, chloroform, and sp. v. r. in the cold, crystallizes readily in large prisms from boiling saturated solutions in the above.

10. Napellin proper is an alkaloid distinct from the above alkaloids.

11. Lycoctonin is likewise a distinct alkaloid, and is exceedingly well characterized by the behaviour of its watery solution with bromine water, and iodohydrargyrate of potassium.

Equally striking is the quickness with which cautiously melted lycoctonin, after completely cooling, becomes reconverted by moistening with water into crystals.

I am happy to be in a position to throw considerable light on the source of the long-sought pseudaconitina.

When last in London (in August last) I ascertained from our esteemed ex-president, Mr. D. Hanbury, that there had been a large importation of Indian aconite roots, and that they were obtainable at an exceedingly low price. They were represented as coming from Nepaul, but whether they were the produce of *Aconitum ferox*, or of some other aconite, was not ascertainable. I at once determined on testing the nature of the alkaloid or alkaloids they might contain, and procured from Messrs. Barron, Harveys & Co. a supply of the roots, for which I paid the absurd price of 8*d*. per lb. I say absurd, for I have it on record in my price-book that when, some years since, I asked for a quotation of price of *Aconitum ferox*, I obtained the answer 22*s*. per lb.!

Six pounds of these roots I treated after the method explained in my paper on aconite, read before this conference at Nottingham in 1866. I need not, therefore, repeat its details. Of the roots themselves I exhibit some characteristic specimens. In texture they differ much from English aconite roots. They are often tough and leathery, so that they are difficult to powder, even after considerable exposure in the drying closet. These refractory roots are, when completely dry, hard and flinty. It appears that, in these cases, starch has become converted into dextrine. In fact, on tearing a root, the broken edge appears inclined to transparency, exhibiting a sort of waxiness. That this was not due to an unusual proportion of resin was evidenced by the result of my analysis, which showed that the bikh roots were less resinous than the English roots I had previously operated upon.

Omitting mention of the earlier processes, I will commence detail at the point when the alkaloids had been concentrated into a crude acid solution, measuring about six ounces.

This solution, first partially decolourized with animal charcoal, was transferred to a separating funnel and alkalized with ammonia. It became nearly solid; and I was at once aware of the extraordinary richness of the material I was treating. Washed repeatedly with ether, the magma disappeared. After each ethereal washing, the ether was shaken with acidulated water, and used over again. The acid solution thus obtained was again treated with ammonia and



ether. Care was taken to contract the bulk as far as possible; and the ether, loaded with alkaloids but yet scarcely coloured, was put aside for spontaneous evaporation. After about half an hour, white shining crystals begin to make their appearance. These increased from day to day, until the mother liquid had become syrupy. They were then removed, washed with ether, and dried on blotting-paper.

Examined chemically, they correspond in every respect with Flückiger's description of pseudaconitina. They weighed forty-three grains.

The syrupy mother-liquor, evaporated to dryness in a tarred capsule, weighed 130 grains, without reckoning what was temporarily lost in the washings. It had the appearance of resin; became soft over the water-bath; when cold, was brittle and structureless. It was dissolved in alcohol, and the solution poured *guttatim* into boiling water kept slightly acidulated with nitric acid. It dissolved without residue. The solution was concentrated to a thin syrup, and set aside to see whether it would crystallize. It showed no tendency that way, in this respect differing from the alkaloid of *Aconitum Napellus*, so it was diluted with water, and treated with a slight excess of ammonia. The white magma was thrown on to a filter, washed a little with water, then drained on blotting-paper and dried. It weighed in that condition 87 grains.*

* Since writing the above, I have had an opportunity of ascertaining the opinion of Dr. Th. Huseman respecting pseudaconitina and aconitina, expressed in a paper published subsequently to that of Dr. Flückiger in the *Neues Jahrbuch der Pharmacie*. He writes, "The physiological actions of pseudaconitina and of aconitina, when applied externally, differ in this respect—the former acts similarly to veratria, the latter not so. Taken internally, pseudaconitina is given in much smaller doses than aconitina, and often acts fatally. They both depress the action of the heart and lungs, and act similarly but unequally on the bowels."

Adelheim, however, could perceive only a difference of degree, not of kind, between aconitina and pseudaconitina derived from *Aconitum ferox*.

Very soon after Turnbull's discovery of aconitina, and its introduction into medical practice, differences in the action of alkaloids of various sources were noticed. Some would not produce the sensation of numbness, contraction and weight, lasting from two to twelve hours, as described by Turnbull; some were stronger than others; some dilated, others expanded the pupil. From 5 to 6 milligrammes of the stronger kind seem to have been the poisonous dose for a cat, whereas the weaker kinds were toned down step by step to almost positive inertness.

Huseman is decidedly of opinion that pseudaconitina ought not to be regarded as a mere impurity of aconitina, but rather as the true active principle of aconite, and thinks that both alkaloids deserve a place in the dispensary as soon as a method shall have been devised for preparing them in a state of purity.

He regards the Indian aconite roots as the most likely source of pseudaconitina, although he thinks it probable that *Aconitum Napellus* may possibly contain it in small quantity.

Morson's preparation, it is well known, cannot always be relied upon. Its topical action is at times much more powerful than at other times. The method of extraction adopted by him is not known. It is said to be a peculiar one; but there is reason for supposing that its success depends more on careful selection of the roots than on any refinement of chemical treatment.

The loss occasioned by precipitation thus amounted to 43 grains. This was caused mainly by the solubility of aconitina in water. It is stated to dissolve in 150 parts of that fluid, but that proportion is much too little for the recently precipitated alkaloid and an ammoniacal liquor. To avoid loss, therefore, the wash waters and absorbent papers must be looked sharply after.

It is, therefore, probable that the pseudaconitina that from time to time has made its appearance in the European markets, under the name of aconitina, has been derived from the Indian aconites, of which it seems to be characteristic, as lycoctonin is peculiar to the yellow-flowered aconite. The very large proportion of true aconitina yielded by bikh, and the facility of purifying it from its crystalline and sparingly soluble concomitant, point unmistakably to the future source of the alkaloid, and to a large reduction of its present enormous price.

NOTE ON CALAMINE.

By R. Reynolds, F.C.S.

It has been supposed that those who desired the genuine calamine of pharmacy (prepared carbonate of zinc) could obtain such from a manufacturer in Derbyshire. Although this used to be the case, it is so no longer, as the calamine issued from the above source is now a silicate of zinc (the electric calamine of mineralogists) and not a carbonate. The maker appears to be satisfied, because the mineral contains about 70 per cent. of oxide of zinc, and the substitution seems to be the result of difficulty in getting the right substance, and not from any fraudulent intention. However, the fact is not a satisfactory one, and some other means of supply is desirable. The silicate is easily distinguished from true carbonate, inasmuch as it partially dissolves, without effervescence, in hydrochloric acid, and then gelatinizes, from the separation of silica.

The President confirmed the statement of the difficulty in obtaining genuine calamine. He was able, however, to announce that a recent discovery of this ore had been made in the Mendip Hills, which he hoped would soon be made available for the purposes of pharmacy.

Mr. Williams (London) also spoke of the absence of genuine English calamine from the market, but said that a satisfactory article was imported from Belgium.

ON THE PURIFICATION OF AMMONIACAL SALTS FROM GAS LIQUOR, SO AS TO UTILISE THEM FOR PHARMACEUTICAL PURPOSES.

(*Concluding Notice.*)

WENTWORTH LASCELLES SCOTT, F.C.S., ETC.

Following up the experiments referred to last year in my brief note upon the above subject, I have applied the process therein described to some seventeen specimens of ammoniacal liquor of various kinds. The results were entirely successful in fifteen instances, and may accordingly be dismissed with the observation that I find it advisable by way of saving both time and permanganate, to take advantage of the absorptive power of charcoal in the earlier stages of the process: the blocks of "silicated carbon" manufactured by the Battersea Filter Company are extremely convenient for this purpose, and may be used for an indefinite period with an occasional re-heating.

In the remaining two cases, however, it was found impossible to produce either liquid ammonia or salts of that alkali absolutely "sweet" and free from all suspicion of tar: even five or six alternate neutralizations with acid and (after crystallization) distillation from alkali failed to effect the object desired; treatment with chromic acid seemed perfectly useless, and the effect of permanganates was to modify the evil but without destroying it entirely. Analysis proved of little utility in determining the nature of the odour and flavour clinging so persistently to these ammonia salts, although toluidine or some very similar base was specially indicated in these samples.

Eventually the difficulty was solved by the employment of nascent or free chlorine in conjunction with permanganates or just previously to the addition of the latter. At first *nascent* chlorine derived from hypochlorite of sodium or aqua regia was adopted as the purifying agent, but the gas itself or its aqueous solution is equally effective; by this means the character of the odorous "twang" is almost instantaneously changed for the better, and its entire removal can then be effected by means of a permanganate as suggested in my former note.

Professor ATTFIELD said that the next and last paper had only just reached him by post, and hence had not been submitted to the executive committee in the usual manner. It would much facilitate

the transaction of the business of the Conference if gentlemen would transmit their papers a week or two before the meeting, and the titles of their contributions as early as possible. He would draw the attention of members present to a notice which had appeared on all printed circulars relating to the meeting:—

"*Authors are specially requested to send the titles of their papers to either of the general secretaries two or three weeks before the annual meeting. The subjects will then be extensively advertised, and thus full interest be secured.*"

REPORT ON THE PURITY OF COMMERCIAL SALTS OF LITHIUM.

By W. L. Scott, F.C.S.

The author had apparently examined twenty-seven samples, obtained from different sources. Of these sixteen were found to be pure, six showed signs of extraneous matter, and five were adulterated to a greater or less extent with carbonate of sodium, cream of tartar, and powdered petalite, a result which the author thought on the whole to be satisfactory. This was the substance of the paper.

Mr. Williams remarked that some carbonate of lithium had been met with that contained 60 per cent. of carbonate of sodium.

Mr. Atherton (Nottingham) moved the following resolution.

"That the best thanks of the Conference be given to the authors of papers read before it."

Mr. H. S. Evans seconded the resolution, which was heartily carried.

Mr. Carteighe said he had been permitted the privilege of moving the following resolution:—

"That the cordial thanks of the assembled members be presented to their brethren of Liverpool and the neighbourhood, especially to Messrs. Abraham, Sumner, Shaw, Davies, and the other members of the Local Committee, for their great and successful efforts in organizing the Exhibition, making arrangements for the meetings, and promoting the general objects of the Conference, as well as for the hospitable reception they have accorded to their visitors."

He begged to assure the chairman and all the gentlemen on the

local committee that this resolution expressed, though feebly, the *real* feelings of all the visitors, and that they were not only thoroughly conscious of the large expenditure of time and money required in organizing their Exhibition of singular excellence, but also deeply sensible of the personal kindness and hospitality displayed with so much continuity by their Liverpool friends. He was convinced the resolution would be received with all the acclamation that it deserved.

Mr. SAVAGE (Brighton) seconded the motion.

Professor ATTFIELD said that he could not allow the resolution to pass without adding his testimony to the excellence of all the arrangements which had been made by the local committee. The chairman, Mr. Abraham, and the local secretary, Mr. Davies, had shown every anxiety to ascertain what steps would be most conducive to the success of the meeting, and these were in all cases carried out promptly and efficiently. The wishes of the officers of the Conference had been completely anticipated by the local committee.

The resolution was carried amid hearty cheering.

Mr. ABRAHAM acknowledged the vote of thanks, and expressed his satisfaction that their arrangements had met with the approval of their friends. A knowledge of this, and the kind way in which it had been now expressed, was an ample reward for any exertions which they had made.

Mr. SHAW replied, and said that they had during twelve months looked forward with pleasure to the meeting which had now been held. His post as treasurer of the local committee had brought him into contact with the members of the trade generally, and all were anxious that a suitable reception should be given to the Conference.

Mr. DAVIES also replied, and received from the meeting a very cordial and well-deserved recognition of the admirable way in which he had performed the onerous duties of local secretary.

Mr. SAVAGE moved and Mr. MACKAY seconded a vote of thanks to the treasurer and general secretaries.

Mr. WILLIAMS moved and Mr. SHAW seconded a vote of thanks to the president, which was put to the meeting by Mr. Abraham, and warmly received. The president acknowledged the vote.

THE EXCURSION.

Thursday, September 15th.

Among other evidences of hospitality, the Liverpool chemists set apart one day for an excursion, and had already taken care that it should be fully occupied. The social enjoyment of the occasion was greatly enhanced by the glorious sunshine which seemed to have been specially retained, and the Liverpool meeting was fitly closed and crowned by a liberal banquet in the evening provided among the ruins of Halton Castle. It may be well understood that 150 hungry chemists left behind them more ruins than they found. It is our purpose to give brief descriptions of the works visited during the day, as the manufactures inspected were of more than local or temporary interest.

GOSSAGE'S SOAP WORKS.

The first establishment visited was the Soapery of Messrs. Wm. Gossage & Sons, at Widnes. Mr. F. H. Gossage conducted the party, and won golden opinions for his courtesy, and the clearness of his descriptions. This establishment has sprung up within a few years from a small commencement, and now occupies almost, if not quite, the highest position as a soap manufactory in the United Kingdom. Mr. Gossage was a manufacturing chemist, and commenced to make soap in the year 1855.

In that year the war between our country and Russia was raging, and the value of all kinds of fats and oils was greatly enhanced. Mr. Gossage directed his thoughts to finding a substitute possessing some of the properties of Russian tallow, and thereby decreasing to some extent our dependence upon Russia for a supply of this article. He found that the compound known as soluble glass, or silicate of soda, was possessed of high detergent powers, and when prepared and applied in a suitable manner, it proved a valuable compound for combining with ordinary soap. This compound is analogous in several of its properties to soap made from tallow and soda, inasmuch as ordinary soap is a substance in which the alkali (soda) is held in a state of weak combination with tallow, and therefore in a condition to exercise its well-known cleansing power. In like manner, silicate of soda is a compound in which soda exists in a state of weak combination with silica, thereby retaining its cleansing power, just as it does in ordinary soap. Mr. Gossage obtained a patent in 1855, and has since taken out

other patents for subsequent improvements in the mode of working. We will describe briefly the process by which the very curious article, "soluble glass," is produced. The apparatus employed for this purpose consists of a large reverberatory furnace, in which are melted together certain proportions of fine white sand and dry carbonate of soda (soda ash) of best quality. Each charge weighs about 25 cwt, and requires six hours of very strong firing to effect its fusion and a perfect combination of the materials. The melted charge is then withdrawn by opening a "tap-hole" in one side of the furnace, and it runs out as perfect glass. The lumps of glass thus obtained are transferred to large vats in which they are exposed to the action of boiling water, and the solution produced is run off into boilers to be concentrated to a suitable strength for transport to other soap manufacturers. In the alkali department, where the rough soda is prepared, from the solution of which is obtained, by purification and caustification, the alkaline lyes required for the manufacture of soap, the rough soda liquors are purified by an ingenious arrangement. The impurity in these liquors which affects the colour and quality of the soap produced by their use, is a compound of sulphur, which can be neutralised by the action of atmospheric air. The knowledge of this fact was useless until means were devised by which the rough liquors and air could be brought into intimate contact with each other. Mr. Gossage hit upon the happy thought of distributing the rough liquors over the innumerable surfaces presented by pieces of coke contained in a high tower, at the same time that air passed through the tower. We saw the very impure liquor being supplied at the top of the tower, and flowing out from the bottom in a state of purity, the only agent employed being atmospheric air, which applied itself to its work of purification without any trouble or assistance. This liquor is of course the real detergent in the soap, the tallow or other material being merely the vehicle which conducts it.

After the ingredients are prepared they are boiled together, and the liquid soap is transferred while hot by ingenious arrangements, whereby twenty tons can be delivered in as few minutes into large iron moulds, where it cools, and the frames being removed, stands erect a mass weighing about three-quarters of a ton. When partially dry the soap is cut up into bars, in much the same way as bricks are made, and we are informed that two men and six boys would cut as much as forty tons of soap in a day. So much for soap.

JOHN HUTCHINSON & CO.'S ALKALI WORKS.

The first process shown here was the roasting of pyrites for the production of sulphuric acid. From the large leaden chambers in which the acid is condensed, it runs to the salt-cake furnaces. Here sulphate of soda (technically called salt-cake), is formed by the action of sulphuric acid upon chloride of sodium (common salt). The hydrochloric acid evolved, being collected in the condensing towers, is subsequently employed in the manufacture of bicarbonate of soda, and in the recovery of sulphur from alkali-waste by Mond's process. The next operation was the decomposition of sulphate of soda by Leblanc's process. This is effected by heating the sulphate, together with limestone and small coal (slack), in a reverberatory furnace (black-ash furnace.) The resulting black-ash broken up and lixiviated in the "vats," yields a saturated solution of soda, principally as carbonate; whilst from the insoluble residue known as alkali-waste, the sulphur is recovered. The solution of soda (vat-liquor) is either evaporated in over-fired pans by the waste heat of the black-ash furnaces, so as to produce salts which, when calcined in a "finishing furnace," form the soda-ash of commerce, or after being diluted with water and "causticised" by boiling with quick-lime, is evaporated in under-fired cast-iron pans, known from their peculiar form as "boat-pans," from which it passes to the "finishing pots," where all the water which can be expelled by heat is drawn off, and caustic soda (hydrate of soda) remains behind in a state of fusion. Whilst still hot, it is poured into wrought-iron drums, in which on cooling it solidifies, and is then ready for market.

The manufacture of soda crystals (washing soda) from soda-ash was then shown. The soda-ash being dissolved in water by the aid of steam, the hot solution is allowed to stand for several hours, in order to deposit whatever impurities it may contain in suspension, and when clear, is run off into crystallizing cones or pans, in which, after the lapse of several days, the formation of the crystals is completed. A portion of these crystals is sent to market packed in wooden casks or barrels of various sizes, the remainder being reserved for transformation into bicarbonate of soda. For this purpose the crystals are piled up in large air-tight vessels constructed of iron, wood, or lead, which when full are closed, and into which a stream of carbonic acid gas, prepared by the action of dilute hydrochloric acid upon limestone (carbonate of lime), is then turned. The carbonic acid is rapidly absorbed, the water of crystallization, containing sesqui-carbonate of soda in solution, flows away, and in

the course of eight or ten days, the contents of "chambers" containing fifty to sixty tons of crystals, are converted into bicarbonate of soda. The bicarbonate, in lumps retaining the original form of the crystals, is then conveyed to the "drying kilns," whence, when dry, it proceeds to the mill to be ground and dressed in a manner similar to flour, and is afterwards packed in small white wood kegs.

The sulphur recovery process is exceedingly simple. The alkali-waste above mentioned, being oxidized by means of a current of air driven through it by a rotating fan, is submitted to lixiviation, and from the yellow solution which it yields the sulphur is precipitated on the addition of hydrochloric acid. The sulphur is then melted by steam heat under pressure, and after cooling, is ready for market. Being very pure, it is now much used for the manufacture of gunpowder.

This manufactory is one of the largest in the kingdom. It employs upwards of 500 men and boys, and produces weekly 375 tons of sulphate of soda, the whole of which is afterwards decomposed on the premises, yielding 160 tons of soda-ash, 40 tons of crystals, 40 tons of bicarbonate of soda, and 50 to 60 tons of caustic soda. It consumes weekly upwards of 200 tons of pyrites, 340 tons of salt, 420 tons of limestone, and 1250 tons of fuel.

The last works visited were those of

THE RUNCORN SOAP AND ALKALI COMPANY.

At these works several new and highly interesting chemical processes were shown to the visitors, among others, the preparation of sulphuric acid. The extraction of copper from burnt pyrites, by what is known as the wet process, also excited considerable interest, and the rest of the company's manufactures, including soda-ash, soda, crystals, and soap, were also explained and inspected.

CLOSING BUSINESS.

Tuesday, September 20.

The Conference met at 10 a.m.; Mr. ABRAHAM, Vice-President, in the chair. He said that the first business to be considered by the meeting would be some proposed alterations in the rules.

It was then proposed by Mr. CARTEIGHE, and seconded by Mr. H. MATTHEWS,—

"That Rule 1 be altered as follows:—Any person desiring to become a member of the Conference shall be nominated in

writing by a member, and be balloted for at a general meeting of the members, two-thirds of the votes given being needful for his election. If the application be made during the recess, the Executive Committee may elect the candidate by a unanimous vote."

Mr. REDFORD expressed an opinion, in which Mr. DAVIES concurred, that there should be no restrictions upon the admission of members to the association, but that it should be thrown open to all.

Mr. SAVAGE thought that the right of demanding a ballot should be retained.

Mr. ATHERTON thought the Executive Committee should have the power to reject a candidate.

Mr. HORTON asked whether there was any rule about expulsion? He would also like to know how often the Executive Committee met.

Mr. REYNOLDS said that any member whose subscription was more than two years in arrears, after written application, was liable to be removed from the list by the Executive Committee. Members might be expelled for improper conduct by a majority of three-fourths of those voting at a general meeting, providing that fourteen days' notice of such intention of expulsion were sent by the secretaries to each member of the Conference. The Committee met whenever there was any business to transact.

Mr. REDFORD suggested that a list of candidates for membership should be posted to the members every three months.

Mr. SUMNER suggested that each candidate should be nominated by a member residing in the same locality.

Mr. ROBBINS thought that persons on the Register of Chemists and Druggists should be entitled to membership without election; all others should be elected.

An amendment was then proposed by Mr. SAVAGE, and seconded by Mr. ROBBINS.

"That all members registered as chemists and druggists, on payment of the annual subscription, be freely elected; but all others not so registered shall either obtain the signature of the local treasurer, or be subject to the veto of the Executive Committee."

This, upon being put to the vote, was lost.

Another amendment was moved by Mr. DAVIES, and seconded by Mr. DUTTON,—

"That any person desiring to become a member of the Conference shall forward his name and address to the Treasurer, with subscription for the current year."

Mr. SUMNER asked what scrutiny the Executive Committee could exercise in the case of candidates living at a distance?

The amendment was then put to the vote and rejected.

The original resolution was carried unanimously.

The following alteration in Rule V. was proposed by Mr. GROVES, seconded by Mr. SAVAGE, and carried unanimously:—

> "The officers of the Conference shall be a President, four elected Vice-Presidents, all past Presidents, who shall be Vice-Presidents, a Treasurer, two General Secretaries, one Local Secretary, and nine other members, who shall collectively constitute the Executive Committee. Three members of this Executive Committee to retire annually by ballot of the annual meeting, the remainder being eligible for re-election. The Executive Committee shall be elected at each annual meeting by ballot of those present."

Upon the proposition of Mr. EVANS, seconded by Mr. ATHERTON, it was resolved unanimously,—

> "That the invitation to hold the next meeting of the Conference in Edinburgh, in August, 1871, be accepted."

Upon a ballot being taken, the following were declared to be the retiring members of the Executive Committee:—Mr. S. C. Betty, Mr. Cooper, and Mr. J. T. Robinson.

It was proposed by Mr. ATHERTON, seconded by Mr. WILLIAMS, and carried unanimously,—

> "That in consequence of the large increase in the number of members, the Executive Committee be recommended to appoint a paid agent as Assistant-secretary and Sub-treasurer."

The ballot for officers for 1870–71 was then taken; the chairman declared the result to be as follows:—

President.

W. W. STODDART, F.G.S., F.C.S.

Vice-Presidents who have filled the office of President.

H. DEANE, F.L.S.
Professor BENTLEY, F.L.S., M.R.C.S.
D. HANBURY, F.R.S., F.L.S., F.C.S.

Vice-Presidents.

J. ABRAHAM, Liverpool.
H. C. BAILDON, Edinburgh.
J. INCE, F.L.S., F.C.S.
J. WILLIAMS, F.C.S., London.

Treasurer—G. F. SCHACHT.

General Secretaries.

Professor ATTFIELD, PH.D., F.C.S.
R. REYNOLDS, F.C.S., Leeds.

Local Secretary—J. MACKAY.

Committee.

F. B. BENGER, Manchester.
H. MATTHEWS, F.C.S., London.
M. CARTEIGHE, F.C.S., London.
G. BLANSHARD, Edinburgh.
T. B. GROVES, F.C.S., Weymouth.
W. MARTINDALE, London.
E. DAVIES, F.C.S., Liverpool.
H. B. BRADY, F.L.S., F.C.S., Newcastle-on-Tyne.
F. SUTTON, F.C.S., Norwich.

It was proposed by Mr. SUMNER, seconded by Mr. BOURDAS, and carried unanimously,—

"That Mr. H. S. EVANS and Mr. J. F. ROBINSON be elected Auditors for the present year."

It was proposed by Mr. ROBBINS, seconded by Mr. EVANS, and carried unanimously,—

"That a grant of books, of the value of ten guineas, be made from the Bell and Hills Fund to the Library of the Liverpool Chemists' Association."

The President of the Liverpool Chemists' Association thanked the Conference, on behalf of the Association, for the gift, and said that their Library now amounted to about six hundred volumes.

It was proposed by Mr. MATTHEWS, seconded by Mr. BOURDAS, and carried unanimously,—

"That the best thanks of the Conference be presented to the Committee of the Liverpool Royal Institution, for the use of its rooms for the meetings of the Conference."

It was proposed by Mr. MARTINDALE, seconded by Mr. WILLIAMS, and carried unanimously,—

"That the best thanks of the Conference be tendered to the Trustees and Managers of the Liverpool Savings Bank for the use of its rooms for the Exhibition of Objects relating to Pharmacy."

A vote of thanks having been accorded to the chairman, the proceedings terminated.

PHARMACEUTICAL EXHIBITION,

HELD AT LIVERPOOL, SEPTEMBER, 1870, IN CONNECTION WITH THE MEETING OF THE BRITISH PHARMACEUTICAL CONFERENCE.

AGNEW, J., *Liverpool.*
Cod-liver oil jelly.

ATTFIELD, PROFESSOR.
Weights and measures. Comments on the metric decimal system. Model illustrating the cubic contents of a litre.
Photographs of prominent Members of the Pharmaceutical Conference.

AUSTIN & Co., *Liverpool.*
Cardboard, wood and ornamental paper boxes for chemists' use.
Glass feeding-bottles.

BAILDON, H. C., *Edinburgh.*
India-rubber poison capsules. Saccharo-chirettine—active principle preserved by sugar, by D. S. Kemp & Co., Bombay and Poona.

BALMER, J., *London.*
Specimens of the sulpho-carbolates of the metals, alkalies, and alkaline earths.
The new belladonna plaster. *See* PHARM. JOURN., May, 1870.

BARBER, GEORGE, *Liverpool.*
Pharmaceutical labels for bottles, drawers, museums, or cabinets of materia medica. Each label contains an abridgment of the information found in the Pharmacopœia. In this way the labour of reference is avoided.
The medico-botanical map of the world and pocket companion to the Pharmacopœia.

BEATSON & Co., *Rotherham Glass Works.*
Poison bottles.

BLANDY, H.
Blandy's patent wash-bottle for nitrous oxide gas.

BOSTOCK, W., *Ashton-under-Lyne.*
Genuine medicated lozenges.

BRITISH SEAWEED COMPANY, LIMITED, THE. A fine collection of products from seaweeds, obtained by Stanford's process, numbering about fifty specimens; the series includes three varieties of *Laminaria* and three varieties of *Fucus*, which are generally

used for this purpose. The charcoals from these are all shown, and the residues after lixiviation. The crude potash and soda-salts thus obtained, with crude iodine and bromine, follow in a series. Resublimed iodine, in fine crystals, and a collection of pure potash salts, manufactured by this company, are also exhibited. The pure chloride forms the basis of these; sulphate, carbonate, and bicarbonate, iodide and bromide, are specially well-represented salts, of which the company are large makers. This admirable collection has been presented to the Museum of the Pharmaceutical Society, by Edward C. C. Stanford, Esq., who has promised further to add to it, and to exhibit results of his latest researches on seaweed.

A stuffed specimen of the *Fulmarus glacialis*, or *Fulmar Petrel* of St. Kilda, and a specimen of the oil vomited by it. This remarkable bird is described in a paper read before the Conference by Edward C. C. Stanford, Esq., and the specimen is presented by him to the Pharmaceutical Society.

Products from excreta obtained by Stanford's process. These are sulphate of ammonia and solution of ammonia, exhibited to show the purity of ammonia salts from this source. Acetate of lime and excreta charcoal which has been burnt twenty times. The process is a dry process, in which charcoal is substituted for earth; the quantity required is one fourth that of earth, and the supply is derived from the excreta itself; the charcoal from this source being a most powerful deodorizer.

Particulars of Stanford's patent process may be seen in the *Chemical News*, vol. xx., p. 196, also *Report of British Association*, 1869, and *Proceedings of Glasgow Philosophical Society*, 1869.

BUSHBY, THOMAS.

Pill-making machine.

CALVERT & Co., *Manchester*.

Carbolic acid, crude and refined.

Sulpho-carbolates.

Carbolic soaps, in bar and cakes.

Picric acid.

Disinfecting powder.

"CHEMIST AND DRUGGIST," PROPRIETORS OF THE, *London*.

The whole of the designs (twenty-eight in number) for a dispensing counter, for the prize offered by the proprietors of the *Chemist and Druggist*. The competitor who obtained the prize was Filmer Kidston, Duke Street, Union Street, Bishopsgate, London, with the following report:—"This design has several points of excel-

lence; besides being the best arranged and most convenient as a dispensing counter, it is handsome in appearance without being showy."

Five other competitors were awarded honourable mention, viz., Messrs. Beynon, Fletcher, Watson, Willis, and Young. The gentlemen appointed to judge the merits of the designs were Messrs. T. H. Hills, Joseph Ince, and Charles Savory. The various designs seemed to afford great interest to pharmaceutists, and were freely criticized during the whole time the exhibition was open.

A model of the arrangement for the storage of poisons, by Mr. J. C. Young, of Warrington. A full description, with engraving, appears in the *Chemist and Druggist*, September 15th, 1870.

DINNEFORD & Co., *London.*

Improved horsehair flesh-gloves, belts, Clarendon flesh-rubbers, Cambridge and Excelsior pads, horse glove brushes, etc., manufactured by them with improved machinery.

ELLIS & Co., *Ruthin.*

Mineral medicated waters.

EVANS SON & Co., *Liverpool;* AND EVANS, LESCHER & EVANS, *London.*

One of the most interesting series of objects exhibited was a large collection of plants in pots,—mainly contributed, we understand, by the kindness of Mr. Tyerman, Liverpool Botanic Gardens, and representing the source of many articles of materia medica not produced in Great Britain. The list is as follows:—

Jalap; camphor; Barbadoes aloes; green tea; tapioca; lime; arrowroot; scammony; gamboge; annatto; lemon grass; nutmeg; cinnamon false, ditto true; clove; locust; castor oil; coffee; vanilla; cinchona pale, ditto yellow; nux vomica; mango; jatropha curcas, or physic nut; caper; ginger; long pepper; tamarind; black pepper; balsam of Peru; pomegranate; Montserrat lime fruit juice, and mature fruit; and tree with immature fruit imported from the Olveston plantation in the island of Montserrat.

MESSRS. EVANS SON & Co. also exhibited a large collection of drugs and pharmaceutical preparations, concentrated waters, etc.

Bengal opium.

Patna ,,

Turkey ,,

And various other raw drugs.

Sapo durus for liniments, with specimens of lin. potas. iodid., etc

Crystallized oil of thyme, or thymol.

Cabinets of materia medica and chemicals; Lescher's "Elements

of Pharmacy," and other books; pharmacy microscopes of various powers, prices, etc., suitable for students.

EVANS, R., *Liverpool.*

Improved feeding-bottle.

FOULKES, W. J., *Birkenhead.*

Transparent fluid cement.

Specimens of breakages in glass and pottery admirably joined therewith.

GILBERTSON & SONS, *London.*

Poison bottles, Merrikin's patent pentagon acid bottles with indestructible labels.

GILLON & Co., *Leith.*

Extractum carnis and essence of beef, concentrated meat essences, sweet milk, preserved fresh salmon, lime-juice cordial, and other preparations.

GOODALL, H., *Derby.*

Levigating machine, and specimens of drugs ground thereby.

GOOSEY & ROGERS, *Stepney, London.*

Marginal plasters.

HARGREAVE & Co., *Manchester.*

Poison bottles.

HARVEY, REYNOLDS & Co., *Leeds.*

Large photograph of business premises.

Fine specimens of extract from English beef.

HAYWOOD, J. S., *Nottingham.*

Model displaying surgical stockings and the applications of elastic fabric.

Truss, chest warmer.

HERRINGS & Co., 40, *Aldersgate Street, London.*

Expressed juices, officinal and non-officinal, of conium, digitalis, wild lettuce, henbane, belladonna, broom, colchicum, goose grass, taraxacum, buckthorn, buckbean, etc.

Resin of scammony, entirely free from saccharine matter most commonly found in the resin scammony of pharmacy, which in the majority of specimens is merely hardened alcoholic extractive of scammony root; scammony roots.

Ol. myristicæ express.—This oil is obtained by hydraulic pressure from crushed nutmegs; in odour it is far superior to common oil of mace.

Expressed oil of stavesacre obtained by hydraulic pressure (50 cwt. to the square inch) from the crushed seeds of *Delphinium Staphysagria.* This oil is now used in preference to the ointment in some of the London hospitals.

Resin podophyllin is now almost wholly imported from the United States, where it is obtained by a process somewhat different to that of the British Pharmacopœia. The specimen manufactured according to the B. P. process is equal, if not superior, to the imported resinoid.

Sulphate of quinine. Citrate of iron and quinine (containing an equivalent of 25 per cent. sulphate), also citrate of iron and quinine of corresponding strength, made with amorphous quina.

As the manufacture of quinine is only carried on in two or three establishments in the kingdom, we have seldom opportunities of seeing the results of the competition of English manufacture. The specimen exhibited is, we think, as good as any we have previously seen.

Specimens also of granular effervescent citro-tartrate of soda, and of powders as ground in their drug mills.

Messrs. Herrings' laboratories and drug mills are under the superintendence of Mr. C. Umney, whose name is well known to pharmaceutical chemists.

HODGKINSON, KING & Co.

Quinovate of lime, a new preparation of Peruvian bark.

Bichloride of methylene, a new anæsthetic.

HOOD & Co., *Melbourne*. EXHIBITED BY MORSON & SON, *London*.

No. 1, opium from Sunbury, near Melbourne.

No. 2, „ from Gisborne, near Melbourne; rich alluvial soil, well manured.

No. 3, „ from Gipp's Land; rich soil, cold climate.

No. 4, „ from near Gisborne; volcanic soil.

No. 5, „ from South Yarra.

No. 6, „ from Dromana, on the shores of Port Phillip; very sandy soil.

A paper upon these specimens of opium was communicated to the Conference by Mr. Morson.

HOPKIN & WILLIAMS, Messrs., *London*, LIST OF SPECIMENS EXHIBITED BY.

1. Mercury biniodide. 2. Bismuth citrate ver. 3. Zinc sulphocarbolate. 4. Soda sulphocarbolate. 5. Iron sulphocarbolate pur. 6. Uranium nitrate. 7. Anthraquinone. 8. Iodoform. 9. Iron iodate. 10. Delphine. 11. Papaverine. 12. Ammonia tartrate (neutral). 13. Acid cinnamic. 14. Lithia citrate cryst. 15. Chloral, pure anhydrous. 16. Ditto (insoluble modification). 17. Chloral hydrate (mass). 18. Ditto, recryst. pure. 19. Ditto, recryst. from Benzole. 20. Chloral methylate. 21. Chloral alcoholate. 22. Chloral butylate. 23. Chloral amylate. 24. Chloralide. 25. Bromal hydrate. 26. Ethylidene chloride. 27. Methyl acetate.

28. Ethyl bromide. 29. Amyl nitrate. 30. Amyl nitrite. 31. Amyl chloride. 32. Amylene bromide. 33. Amylene bibromide. 34. Benzoyl chloride. 35. Propylamine. 36. Acid chloracetic. 37. Hæmatoxyline cryst. 38. Cantharidine. 39. Curari poison. 40. Ethal. 41. Cholesterine. 42. Apomorphia hydrochlorate. 43. Tyrosine. 44. Leucine.

Notes on the above specimens.

2. Bismuthi citr. ver. Suitable for liq. bismuthi ammon. citr. B.P. 5 grains to 1 drachm nearly represents the Pharmacopœia strength; it is readily soluble in ammonia; it is also quite free from copper, arsenic, and other impurities.
7. Anthraquinone. Interesting as being the intermediate product between anthracine and artificial alizarine; also as one of the series of "kinones."
8. Iodoform. Now largely used as a local anodyne.
9. Iodate of iron. Lately used in medicine.
15. Pure anhydrous chloral. In liquid form.
16. „ In its soluble form.
17. Chloral hydrate. Fused.
18. „ Recrystallized from bisulphide of carbon.
19. „ Recrystallized from benzol.
20. Chloral methylate. Combination of chloral and methyl alcohol, deliquescent.
21. Chloral alcoholate. Sometimes sold as chloral hydrate, but far less effective.
22. Chloral butylate. Possesses a very pleasant smell; insoluble in water.
23. Chloral amylate. Insoluble in water, crystallizing with great beauty; the combination of chloral with various alcohols is attended with a great rise of temperature; in the case of the methyl compound, the mixture actually boils. All these compounds can be readily distilled, and thus be obtained of constant boiling-points, and quite pure.

Chloral hydrate, when distilled, gives a very white and beautiful product.

24. Chloralide. Product of the long-continued action of boiling sulphuric acid on chloral. This body differs essentially from all the other known chloral compounds, inasmuch as when treated with alkalies it yields no chloroform.
25. Bromal hydrate. Now being tried medicinally, but its action not yet fully understood. Its vapour produces a copious flow of tears.
26. Ethylidene chloride. A new anæsthetic, introduced to medicine by Dr. O. Liebreich, of Berlin.

30. Amyl nitrite. This body when pure has a remarkable effect upon the action of the heart, and has been largely used to relieve the spasm in angina pectoris; it is often improperly confounded with nitrate of amyl, a substance quite destitute of the peculiar properties of the nitrite.

35. Propylamine. One of the compound ammonias, having a strong odour of herring-brine; used as a remedy for rheumatism.

36. Chloracetic acid. In crystals; a substitution representative of glacial acetic acid.

39. The Curari or Woorari poison; the arrow-poison of the South American Indians. When applied to a wound, it produces death, but may be administered internally without any ill effects. It is said to act as an antiperiodic.

Howe, E. W., & Co., *London.* Pure chloral; bromal hydrate: carbonate of lithia; white shellac.

Hustwick, T. H., *Liverpool.*

Specimens of sulpho-carbolates of ammonium, magnesium, sodium, calcium, copper, iron, and zinc, also carbolic acid mouth-wash.

Hutchinson, John, & Co., *Widnes.*

Specimens of alkali in various stages of manufacture, and samples of sulphur recovered by Mond's process.

Ince, J., *London.*

Collection of old books, illustrative of the pharmacy of the sixteenth and seventeenth centuries.

Jones, Orlando, & Co., *London.*

Chapman's entire wheat-flour.

Limousin's Oxygen Gas Inhaling Apparatus.

Limousin's drop measures give drops of equal size and of the weight of 5 centigrammes of distilled water. A table, showing the number of drops of several fluids making one gramme, accompanies each measure.

Liverpool Chemists' Association.

Collection of 70 medicinal plants, presented to the association by Ransom, of Hitchen.

Lowe, Charles, & Co., *Manchester.*

Carbolic acid crystals, a solid block weighing 1½ cwt.

Picric acid crystals.

" paste.

Anthraquinone.

Sulphophenate of soda.

" of zinc.

Anthracene, crude.
„ pure.
Rosolic acid, crude.
„ pure.
Naphthaline.
Disinfecting powder.

MACFARLAN, J. F., & Co., *Edinburgh.*

Samples of opium.
Morphia and salts.
Apomorphia muriate, got by the action of hydrochloric acid on morphia.
Oxymorphine (morphine + O), new base (Matthiessen).
Codeine and salts.
„ reproduced from chlorocodide.
Apocodeine chloride, got by the action of chloride of lime on codeine (Matthiessen).
New base, got by the action of H_2SO_4 on codeine (Matthiessen).
Narceine.
Meconine, from E. opii.
„ „ opianic acid.
„ „ narcotine, by water.
These three specimens of meconine have precisely the same chemical composition and physical properties; hence it may be assumed that meconine is not a normal constituent of opium, but a product of the decomposition of narcotine.
Papaverine.
Thebaine.
Meconic acid.
Narcotine and products of decomposition.
New base, obtained by the action of H_2SO_4 on narcotine (Matthiessen and Armstrong).
Hydrochlorate of cotarnamic acid, a new poison (Matthiessen).
Greenheart bark and nuts.
Bebeerine sulphate (com.). Ditto, pure.

MARKS, H., *London, Sponge Merchant.*

Fine sponge, on rock, very rare.
Finger sponge; Turkey cup and honeycomb.

MARTIN, F. R., *Redland, Bristol.*

Numerous specimens of alkaloids and pharmaceutical preparations, also microscopic slides of rare salts, also microscope and spectroscope.

MARTINDALE, WILLIAM, F.C.S., *London.*

Plaster-spreading apparatus, as described in the PHARMACEUTICAL

JOURNAL, p. 33, July, 1869, with additional improvements, so that the front plate can be entirely removed, and the whole cleansed with much greater ease than in the original apparatus, by the different arrangement of the screw-adjustment for regulating the thickness of the plaster.

MASON, A. H., *Liverpool.*

Specimens of artificial borax crystallized on rods.

MAW, SON & THOMPSON, *London.*

Collection of sundries common to the pharmaceutical counter. A great variety of syringes, magneto-electric machines, and an exceedingly fine specimen of enamelled glass, representing the Pharmaceutical arms—unfortunately broken in unpacking.

Pessary and suppository moulds, made according to the pattern designed by Mr. H. B. Brady, of Newcastle-on-Tyne.

We notice a stove designed by Mr. Groves, of Weymouth, and manufactured by Messrs. Maw & Son. It is made up of a series of Bunsen burners in three rings, mounted on a stand, which can be adjusted to any convenient height. Each ring of burners is under the control of a separate tap, there being also a tap which regulates the whole. This arrangement gives a great range of heating power, one good feature being that the gas can be lowered to the lowest conceivable point without going out, as in the case with ordinary large Bunsen burners. Up to this time a stove of the kind, adapted alike to the requirements of both large and small pharmacies, has been a great desideratum.

MOTTERSHEAD & Co., *Manchester.*

A series of cheap German thermometers for laboratory use; the scale is permanently marked on a slip of milk-glass or paper, which, presenting a flat surface to the eye, is easily read off. This slip is enclosed with the tube containing the mercury in an outer strong glass tube. These thermometers are made with scales ranging form 212° to 600° F., at prices from 2*s.* upwards.

Various sets of hydrometers, conveniently arranged with trial jar, thermometer, etc., in cases.

Various forms of Bunsen's gas-burners, illustrating methods of regulating the supply of air to that of gas.

Series of reagent bottles, with indestructible enamelled labels.

Funnel jackets for the filtration of fats, etc., at high temperatures.

Small apparatus for producing and keeping a constant supply of sulphuretted hydrogen for the use of chemists.

Fine wire-gauze masks for protecting the face in chemical experiments.

Improved Dobereiner's hydrogen lamps.

Benger's automatic apparatus for maintaining constant temperatures in some chemical and pharmaceutical operations. *See* PHARM. JOURN., p. 252.

Forms exhibited, a drying closet and an evaporating basin.

PROCTOR, B., *Newcastle-upon-Tyne.*

Pill scoop.

REDFORD, A., *Liverpool.*

Improved pessary mould.

RICHARDSON, R., *Cork.*

Goulding's flower and plant food.

Newnham's pure condensed milk.

Pessary mould.

RIMMEL, E., *London and Paris.*

Perfume vaporizer and fountain.

SARG & Co., *Vienna.*

Glycerine.

Scented glycerine.

Solid and liquid glycerine soap.

SILICATED CARBON COMPANY.

Filters for domestic and manufacturing purposes.

SOUTHALL, SON & DYMOND, *Birmingham.*

The objects exhibited by this firm were in four parts :—

I. A collection of the officinal drugs of the Pharmacopœia of India, which are not contained in the British Pharmacopœia, 1867. These drugs were exhibited in glass jars, to which were affixed printed labels, conveying the

Botanical names,
Habitat of plant,
Officinal part employed,
Properties of ditto,
Therapeutic uses,
Recognised preparations
And doses.

The following is a list of the whole of these drugs which this firm exhibited :—

Rusot (or Rasot). *Hind.* Watery extract from the wood and bark of species of Berberis (*non-officinal*).

Azadirachta Indica. *Nim* or *Margosa* bark and oil.

Luffa amara. *Bindaal.* Stalks of plant.

Coptis Teeta. *Coptis* or *Mishnu.* The dried root.

Datura alba. *Dhatura.* The leaves and seeds.

Aconitum heterophyllum. *Atis.* The dried root.

Aconitum ferox. *Bikh* or *Bish*. The dried root.
Diospyros embryoptera. *Gab*. The fruit.
Narcotine. Alkaloid.
Pharbitis Nil. *Kaladina*. The seeds.
Andropogon (Cymbopogon) Nardus. *Citronelle*. The oil.
Andropogon (Cymbopogon) citratum. *Lemon-grass*. The oil.
Mylabris Cichorii. *Telini fly*. The dried insect.
Carum (Ptychotis) Ajowan. *Ajwain* or *Omum*. The fruit.
Plantago Ispaghula. *Ispaghúl*. The seeds.
Tinospora cordifolia. *Gulancha*. The root and stems.
Butea frondosa. The seeds.
Gynocardia odorata. *Chaulmugra*. The seeds and oil.
Hydrocotyle Asiatica. *Indian pennywort*. The leaves.
Cæsalpina (Guilandina) Bonducella. *Bonduc*. Seeds.
Citrus Bergamia. *Lime*. The fruit.
Dipterocarpus lævis. *Gurjun*. Wood oil.
Boswellia floribunda. *Olibanum*. The gum resin.
Sinapis juncea. *Rai* or *Indian mustard*. The seeds.
Garcina pictoria. *Indian gamboge*. The gum resin.
Soymida febrifuga. *Rohun tree*. The bark.
Acacia Catechu. *Catechu*. The extract of heart-wood.
Alstonia scholaris. *Alstonia*. The bark.
Anamirta Cocculus. *Cocculus*. The dried fruit.
Punica Granatum. *Pomegranate*. The root bark.
„ „ „ The dried pericarp of fruit.
Andrographis paniculata. *Kariyát*. The dried stalks and root.
Mucuna pruriens. *Cowhage*. The hairs of the pod.
Oryza sativa. *Rice*. The husked seeds.
Berberis. *Indian barberry*. The root bark.
Gracilaria lichenoides and G. confervoides. *Ceylon moss*. The dried plant.
Calotropis gigantea. *Mudar*. The root bark.

II. A case containing large specimens of eight scale preparations, and six salts of bromine and iodine manufactured by this firm, viz.—

Ferri et ammoniæ citras, P.B. 1867.
„ „ „ made with iron wire.
Ferri et quiniæ citras, P.B. 1867.
Ferri et strychniæ citras.
Ferri citras; ferri pyrophosphas; ferrum tartaratum; bismuthi et ammoniæ citras; cadmii bromidum; cadmii iodidum; ammonii bromidum; ammonii iodidum; potassii bromidum; potassii iodidum.

III. Four tall glass jars, containing specimens of Analyzed

Drugs answering to the tests of the British Pharmacopœia, 1867, viz:—

Opium, containing *at least* 6 to 8 per cent. of precipitated morphia.

Scammonium, yielding from 80 to 90 per cent. of resin.

Yellow cinchona bark, containing at least 2 per cent. of nearly pure quinia.

Pale cinchona bark, yielding not less than $\frac{1}{2}$ per cent. of alkaloids.

(The importance of affixing to these and other drugs a guarantee of strength, so as to ensure uniformity in the administration of doses, cannot be over-estimated.)

Four other tall glass jars, containing specimens of

Oleum morrhuæ,
Succus taraxaci,
Oxymel scillæ, and
Solution of iodide of iron.

(One fluid drachm of this solution is equivalent to one drachm of solid iodide of iron. It is readily employed in dispensing and in making the syrup of iodide of iron, which, if made with grape sugar, will keep well without decomposition.)

IV. Several cases of the sixth edition of the collections of specimens of the organic materia medica of the British Pharmacopœia, 1867, for the use of medical and pharmaceutical students.

SILVERLOCK, H., *London.*

Working model of poison cabinet, containing 40 labels of various sizes on revolving stand, only 1 label on either disc being exposed to view at once.

Labels on red ground, and distinctive collection of dispensing and trade labels.

SPENCE, BERGER & Co., *Manchester.*

Samples of Mudie's disinfectant.

Jordan's Norway cod-liver oil.

SPENCE, PETER, *Manchester.*

Very fine crystals of alum, manufactured under exhibitor's patent.

SUMNER, R., JUN., *Liverpool.*

Nicely crystallized specimens of sulphocarbolates of zinc and soda.

THONGER & Co., *Liverpool.*

Poison labels.

TOMLINSON, M., *Manchester.*

Mahogany dispensing counter with carved glass cases and mirror screen, and fitted with expedio label rack.

Species jar, pedestal stand, and sundries.

WATTS, DR. J., *London.*

Variety of tanning materials, with estimation of amount of tannin.

Extract of *Abies Canadensis*.

WEBB, A., *Clapham*.

Herbarium—an excellently arranged collection of dry plants, for which the prize medal of the Pharmaceutical Society was awarded, October 5, 1870.

WHITTHREAD, Mr., *Liverpool*.

Specimen of *Pistachia Lentiscus* plant, and of *Pistachia Terebinthus*, from Scio; also fine white gutta percha and pure silica.

YORK GLASS COMPANY.

Swan-necked show bottle, percolators, poison bottles, etc.

A FEW ADDITIONAL NOTES BY A VISITOR.

We were thankful that the Liverpool Committee had taken such pains in bringing together their well organized and well arranged exhibition of articles illustrating pharmaceutical progress. The collection was placed in two rooms over the Savings Bank, in Bold Street, and these were fairly filled with objects, without being overcrowded. The smaller room might have been a reading-room for ghosts, as it contained Mr. Ince's collection of 100 old books on pharmacy.

Among the books exhibited were some that possessed more than a pharmaceutical interest, especially one contributed by Mr. Hanbury, entitled "Hieronymus Brunschwyg on the Art of Distillation." This was in German, and was published at Strasburgh in 1515. It contains many most remarkable plates, grotesque in the extreme, and a large number of marginal notes, in the handwriting of Philip Melancthon, in whose possession it had once been.

Mr. Martindale's ingenious apparatus for spreading plasters was also displayed here, and worked occasionally; also a herbarium, which was kept carefully locked, except on any request for inspection. These delicate preparations should never be forwarded for *public* inspection. The liberality of the exhibitor was beyond question, but he would have been disappointed had he discovered his choicest mountings mutilated, and his best specimens destroyed. In the larger room, on entering, the visitor was met with a tempting display of metric weights and measures, exhibitor anonymous; Dr. Attfield, doubtless. Every one acknowledged how much more perfect the metric system was than that which we now use, and at least 90 per cent. of us silently hoped that the change would never be made in our days. Next to these was M. Limousin's apparatus for the manufacture and inhalation of oxygen.

Messrs. Howe & Co., of Aldermanbury, are agents in London for

M. Limousin. This firm also exhibited other chemicals of Continental manufacture, some cheap tannin for technical purposes, bleached shellac, etc. Messrs. Evans, Lescher & Evans added greatly to the appearance of the room, by a most interesting collection of tropical medicinal plants in growth, including cinchona, ginger, several peppers, cinnamon, nutmeg, castor oil, vanilla, camphor, and many others. Besides, they contributed an excellent collection of drugs and pharmaceutical preparations, and a supply of Montserrat lime-juice cordial for refreshment purposes. Also a sample of thymol, a solid white oil of thyme of very pure odour, now used in perfumery.

Carbolic acid was in force. Messrs. Calvert & Co. had a pretty case, showing the acid and a variety of preparations made with it, as well as specimens of other preparations from coal tar. Messrs. Lowe & Co. had a magnificent specimen of the crystallized acid, which, we were informed, weighed not less than $1\frac{1}{2}$ cwt. This firm exhibited also some splendid specimens of anthracene, crude and pure, anthraquinine and rosalic acid. Some of the visitors referred to Messrs. Lowe's exhibit as the gem of the collection. We were also much pleased with a case which was arranged to show the stages of manufacture of caustic soda, as was shown to the members on the excursion day at Messrs. Hutchinson's Works, at Widnes.

Messrs. Southall, Son & Dymond, of Birmingham, had many warm partisans, who would have given them the prize had there been one to receive. Their exhibit was of great interest to pharmacists. A large portion of it consisted of a rare and unique collection of the Indian materia medica,—non-officinal in our Pharmacopœia. We are not quite sure that Messrs. Southall would do much service by adding to our present over bulky list of drugs. We are like David with his armour, and the homœopaths with their growing materia medica,—we have not yet *proved* all the drugs we have. We want more skill in using those we have, not an increase of them. Nevertheless, it may be well to know where a stock of Indian drugs is to be had. Every one noticed the magnificence of Messrs. Southall's scale preparations, and their iodides and bromides were also much admired. They exhibited besides some excellent specimens of various pharmaceutical preparations, and some cases of their analyzed drugs. It seems they have a habit of supplying opium, scammony, and the barks, with the proportion of alkaloid or resin guaranteed, a system worthy of commendation and imitation.

Mr. Stanford (representing the British Seaweed Company, Glasgow) made a handsome display of the products of his special branch of chemical manufacture. This company has for its primary

object the extraction of iodine from the seaweeds yielding it. The charcoal prepared from the refuse, however, is a heavy business, as it has great absorbing powers, and is very cheap. For all the purposes wherein animal charcoal is used, this seaweed charcoal seems an efficient substitute, and Mr. Stanford, as our readers will remember, has lately advocated its employment for the treatment of excreta on the principle of the dry-earth closet, the chief advantage over the use of dry earth being, that 25 per cent. of charcoal, as compared with earth, is sufficient to deodorise the excreta, thus to a great extent obviating the one great objection against the dry-closet system to replace the water, namely, its bulkiness and consequent inconvenience. No doubt the use of this charcoal would add to the value of manure from this source. Mr. Stanford's calculation of the wastefulness of the water-closet system is that the material, worth about 30*s.* per ton, has its value reduced, by dilution, to 1*d.* per ton, which it is impossible, by any known chemical method, to extract with profit.

The other specimens exhibited by this company were a series of potassium salts, crude and resublimed iodine, etc., products from seaweed char, and some liquid ammonia, acetate of lime, and other products from excreta obtained by an entirely new process.

Among other exhibitors of chemicals, we should include a magnificent specimen of alum shown by Peter Spence; a multitude of the opium alkaloids (we hope all of them, for we have a note that there were forty-seven) prepared and shown by Messrs. Macfarlan & Co., of Edinburgh. Mr. Balmer. of St. John Street, exhibited his specialities, the sulpho-carbolates. Messrs. Hopkin & Williams were chiefly strong in various combinations of chloral; and Messrs. Herrings & Co. showed an interesting collection of pharmaceutical preparations. Mr. A. H. Mason, of Liverpool, contributed some beautiful specimens of borax, and Mr. Martin, of Redlands, Bristol, a case of chemicals.

Coming now to sundries, we notice first of all that Messrs. Maw, Son & Thompson, were exhibitors. Among their very interesting display were certain novelties which attracted some attention. Prominent among these were the Nautilus, a new swimming belt, and Messrs. Bullock & Reynold's inhaler. A store poison bottle was the most ingenious of the kind which we have seen. The stopper is bored through by a thick pin, and a spiral spring in connection with it spans the lip of the bottle and clings to the neck, thus entirely preventing the removal of the stopper until a gentle pressure is applied to the nob of the pin. Mulloney's patent bandages were also among Messrs. Maw's goods, and are worth the attention of those who do not know them. They are woven in such

a manner that the edge will expand in exact proportion to the middle of the fabric, so that while the selvage is perfectly firm, and will not unravel in wear or washing, it cannot chafe or indent the most tender limb.

Mr. Tomlinson, of Manchester, was also very prominent with a dispensing counter. He had besides specimens of his well-known specie jars, cod liver oil plasters, and other goods. Mr. Goodall showed one of his levigating machines, and some specimens of powders, extraordinarily smooth, ground thereby.

Mr. Silverlock, besides some specimens of label-printing, exhibited a novelty to which we ask the particular attention of practical dispensers. It was a cylindrical cupboard, $9\frac{1}{2}$ in. in diameter and 27 in. high, containing four shelves inside, all attached to an upright rod in the centre, and intended to hold all the poisons required at the dispensing counter, the different shelves being constructed to hold 2-oz., 4-oz., 6-oz., and 8-oz. bottles respectively, forty in all. The whole of the inside arrangement revolves with perfect ease, and thus at the door of the cupboard the poisons are presented in succession one at a time. In this shape room is greatly economised, and an almost perfect assurance of safety seems to be secured. The arrangement needs to be examined to see how simple it is. Mr. J. S. Haywood, of Nottingham, surgical instrument maker, exhibited the model of a man to whom life must indeed be a burden. The gentleman wore elastic stockings, a truss, an abdominal belt, a chest protector, and, we believe, some other aids to existence. The Silicated Carbon Filter Company made a prominent show of their various styles of filter, some of which are very artistic. We should like to mention in addition, among the interesting objects of this exhibition, Messrs. Gillon & Co.'s preserved meats, concentrated essences, and lime-juice; Mr. Bostock's case of lozenges, which were very excellently finished, and seemed fully equal in quality to those of any London manufacturer; some handsome articles of Mr. Rimmel's; Mr. Barber's (Liverpool) pharmaceutical map and books; a new style of gas-furnace by Mr. Groves; a pill scoop by Mr. B. S. Proctor; some extraordinary specimens of work done by Foulke's cement; and a sample of saccharo-chirettina sent by Messrs. D. S. Kemp & Co.

We must not forget to add that a book containing the original designs for dispensing counters reported on in the *Chemist and Druggist*, and Mr. Young's (Warrington) model showing a safe method of keeping poisons at the dispensing screen, were exhibited on the table, and excited much attention.

A CENTURY OF OLD BOOKS

RELATING TO PHARMACY AND KINDRED SUBJECTS.

EXHIBITED AT THE BRITISH PHARMACEUTICAL CONFERENCE
LIVERPOOL, SEPTEMBER, 1870.

WITH DESCRIPTIVE NOTICES BY

W. A. TILDEN, JAMES COLLINS, DANIEL HANBURY,
A. F. HASELDEN, F. T. MARZIALS, JOHN MOSS,
RICHARD REYNOLDS, AND JOSEPH INCE.

The chief contributions have been received from Provincial Associations and Pharmacists; a few London gentlemen have spared ancient specimens from their libraries; and the Society's own collection is included.

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INTRODUCTION.

A FEW rare old books are here presented for inspection. I have to thank those who have so largely contributed from their stores, and also to acknowledge the skill and promptness with which the descriptive writers have executed their task. This collection was begun, finished, catalogued, and on its way to Liverpool, within the space of one month. It is hoped that a great town such as this manufacturing centre, with its trade activity and its wonderful mercantile intelligence, will not disdain to read these records of the past. Some possess special interest, such as "Gerard's Herbal," remarkable for noble type and quaint illustrations, which at this moment are copied by modern artists; Prosper Alpinus, the Secrets of Alexis, Pomet, and many others. I regret exceedingly for the sake of the Members of the Conference that I have had to stand alone, and that I have been deprived of the aid of one whose power of accurate analysis, lit up by a graceful fancy, would have lent an added charm to these pages. Accept them as an earnest of good-will; they have received as much care as other pressing occupations and anxieties would permit. It is right sometimes to live in centuries not our own; and as men trace out the sources of the Nile, so we may take pleasure in learning the springs from which our present information has been derived. To study these productions is to love them. No man ever yet could decipher a black letter in the spirit of a fossil. None can hold converse with the great dead, and have a mean, ignoble mind; and these ancient tomes hold in their hands the gift of *rest*. I would fain say one other thing. Should any writer wish to escape feebleness of style, and gain manliness of expression, let him become, first, a diligent student of the Bible, specially of Isaiah, the authorized translation of which is the grandest rendering of the English language extant. Secondly, let him be a reverent admirer of men, the composition of whose works has been and will remain a constant theme of admiration. I congratulate whoever he may be to whom this exhibition may prove his first introduction to a

literature much of which seems inspired. What can exceed in stateliness or beauty *the* dedication to King James? What can surpass many sentences which these recondite treatises contain? This statement is not upset by knowing that several have no other recommendation than the date they bear. This class of research moreover may induce a healthy dissatisfaction with ourselves; for while Chemistry has advanced with giant steps, and Botany has shaped itself into a definite science, and is excellently taught, I entertain the heterodox belief that we have altered many things in Pharmacy without improvement. After which dreadful declaration I fall back on Francis Lord Bacon (1597):—

"Reading maketh a full man; conference a ready man; and writing an exact man. And, therefore, if a man write little, he had need have a great memory; if he confer little, he had need have a present wit; and if he read little, he had need have much cunning to seem to know that which he doth not."

JOSEPH INCE.

A CENTURY OF OLD BOOKS.

Pharmacopœa, seu de Usitatiorum Medicamentorum Componendorum ratione Liber Collegii Medicorum Bergomensium opera nunc primum in lucem editus. Bergomi: 1580. *De superiorum licentia. Apud Josephum Pigoccium, bibliopolam. Typis Comini Venturæ.*

An excellent copy, well and clearly printed on good paper. We find in this, as in all pharmacopœias of that time and much later, the same redundancy of composition; each preparation contains in itself no inconsiderable slice of the entire Materia Medica.

In the midst of all these long lists of strange and often incongruous materials, we stumble upon a really sensible tooth-powder, which we commend to those Pharmacists who are in want of a good "form"—

"Cornu Cervi usti
Coralliorum rubrorum
Ossis Sepiæ
Mastiches Albæ

ãã drachma semis. Exactissime trita et lævigata, miscentur."

W. A. T.

Bibliotheca Scholastica, a Double Dictionarie, penned for all those that would have within short space the use of the Latin tongue, either to speake or write. Verie profitable and necessarie for Scholars, Courtiers, Lawyers and their Clarkes, Apprentices of London, Travellers, Factors for Marchants, and briefly for all Discontinuers within her Majesties Realmes of England and Ireland. Compiled by John Rider, Master of Artes, and Preacher of Gods Word.

{First reade / With others conferre / Then censure} me

Reade the Preface, Learne the vse. 1589.

This dictionary is divided into two parts. The first of these is

simply an English-Latin dictionary arranged in a tabular manner, the English word having its Latin equivalent placed below it, so that the two kinds of words never occur on the same line. The second part consists of an index of all the Latin words mentioned in the first part of the book and in conjunction with this forms a Latin-English Dictionary. J. M.

The Garden of Health, conteyning a description of all sortes of simples with their several vertues and properties.—1649 (?).

Looking through this book, we cannot fail to be struck by the great preponderance of the names of plants which are indigenous to this country or naturalized here, over the names of those of foreign origin; showing in very marked manner the extent to which our fathers were dependent on, and studied the action of, those plants which grew at their own doors. The body of the work is in old English character, and consists of a series of numbered statements of the properties of the several simples, frequently varied by recommendations as to the way of exhibiting them. The simples themselves come in alphabetical sequence, commencing with "Abracock," and ending with "Ysope," the popular name being always employed. The statements of properties are in each case followed by a list of the ailments for which the particular simple is recommended, and reference is made by means of a number to that part of the text where each ailment is spoken of. Thus:—

"Withwinde blacke, the juice looseth the belly. 2. The herbe stampt dissolveth swellings. 3. Plucke up haires, and anoynt with the juice and it will grow no more."

Belly bound . 1; Swellings . 2; Haires to void . 3."

The applications of some of the simples are very numerous and diverse. "Holyoke," for instance, is good in no less than a hundred and forty-one of the "thousand natural shocks that flesh is heir to;" and these include "Heartstopt, Haire to grow, Hoarseness, Liver grieves, Poyson, Teethache, Wildefire, etc."

At the end of the book is "a table conteining the effects of all the simples, set downe in this booke, by the order of the alphabet."

J. M.

A Compleat Body of Chymistry: Teaching the whole Practice thereof by the most exact Preparation of Animals, Vegetables, and Minerals, preserving their essential Vertues. By Nicasius le Febure, Royal

Professor in Chymistry to his Majesty of England, and Apothecary in Ordinary to His Honourable Household. Translated into English. 1664.

In the preface, the author acknowledges his indebtedness to Paracelsus, Van Helmout, and Glauber, from whose works his own has been complied. Preliminary to the book proper is a discourse in which are discussed several queries about the nature of Chemistry. Queries relative to the names by which it is known and the propriety of their application; whether it ought to be called an art or a science; and its true end. To the first he makes answer "that we rather choose the name of Chymistry, as being the most vulgarly known and received;" to the second, "that Chymistry may be called both art and science in many respects, and so consequently, a practical or operative science;" and to the third, "that operation is truly the general end of Chymistry."

The "Compleat Body" is divided into two parts. The first treats of Theory and comprises two books. The first of these books commences with "the Principles and Elements of Natural Things," at the head of which stands the Universal Spirit, "which," says Le Febure, "is a substance voyd and divested of all corporeity, and cometh under the domain of Chymistry, thus sufficiently evidencing the error of those who maintain that the Natural Body is the only object of Chymistry." Other names of the Universal Spirit are "Vital Substance," "Vital Mummy," "Balsam of Life," "Natural Heat," etc. "By receiving this Spirit into themselves to make it a body, diverse Matrixes do print in it the character and idea of mixt bodies, to be made such and such determinate substances. Thus in a Vitriolick Matrix it becomes Vitriol; in an Arsenical, Arsenick; a Vegetable Matrix makes it a Plant; and so of all the rest." The several substances which present themselves after the "Resolution and Anatomy of the Compound" are "Phlegm or Water, the Spirit and the Oyl, Salt and E rth." These are the principles or elements which, by the vivifying influence of the universal spirit and by union one with another, form all the varieties of mixed bodies, endowed with new and totally different properties. After each element has been examined in detail, all are treated of generally, and in this part of the book the Hermetical and Peripatetical Philosophies are discussed and compared. The Principles of Destruction next receive attention, and the radical distinction between them and the Principles of Life above mentioned, is pointed out. The universal spirit exercises an equally potent influence in both classes of principles, but receives its stamp or character from the

matrix in which it is enclosed,—if the result be sweet, as sweet things contribute to the service of man, it takes the denomination of *Principle of Life;* if it be sour or corrosive, it is a *Principle of Death.*

In the second book of the first part, the author treats of the effects of impurity of the principles, how impurities may be separated, and of the extraction of pure substances from mixtures. He concludes the theoretical part by telling that "it is not enough to study and read the works of Paracelsus; but you must also use your hands and come to the practical part, if you will unriddle his obscurities: not heeding the time which therein must be spent, nor thinking much of the labours and charges; As most do, who, by the reading of some few Authors only grounded upon the authority and opinions of their Predecessors, neglecting experience and the painfull search of Nature's secrets, think and imagine to attain unto great perfection, though Experience be one of the Columns of the best Natural Philosophy and consequently of the truest Physick."

The second part also comprises two books. In his preface to the first of these, Le Febure says: "I think it very necessary that the senses be well informed and instructed by several Experiences before you give yourself to the Theory, or begin to contemplate upon Natural Things, lest you fall into the error of those superficial Philosophers who please themselves in arguing upon the principles of some doctrine whereof Experience discovers the untruth." The book itself treats, in the first place, of the terms necessary to be understood in performing all chemical operations; afterwards, of furnaces and retorts, with descriptive plates; lastly, of lutes. In the second part come the chemical operations, which occupy at least four-fifths of the volume. The separation of the five principles is first dwelt upon. Then comes a compendium of the chemical knowledge of the time, commencing with a treatise on Meteors, which includes Rain, Dew, Honey, Wax, and Brine. Next follow animal preparations; then vegetables, where it is taught how the parts of that rich and numerous family may be "anatomized." Minerals come last, and under this head are examined "the contents of Stones, Salts, Marcassites, and Metals." The difference between the two last mentioned kinds of bodies consists in the former being fusible but not malleable, whilst metals are both fusible and malleable. The chemical operations that follow are little more than so many recipes for the preparation of various remedial agents, accompanied by examinations of the different methods that may be employed, and by recommendations in what cases to use them.

This volume shows very curiously that Pharmacy is the true

parent of Chemistry; for at the period of its appearance, almost every operation had for its object the separation or preparation of some specific which might be used to alleviate or to remove human suffering or to prolong human life. J. M.

The Aërial Noctiluca: or, Some New Phenomena, and a Process of a Factitious Self-shining Substance. Imparted in a letter to a friend living in the country. By the Honourable Robert Boyle. 1680.

The subject of the letter is Phosphorus. Of this body, the author distinguishes two kinds. Natural, as "Glow-worms; some sorts of rotten wood, and fishes;" and Artificial, as "the Bolonian Stone, Phosphorus, Hermeticus of Balduinus, Noctiluca." On the first kind he does not dwell at all, and he only mentions the Bolonian Stone and Phosphorus Hermeticus by way of introduction to the Noctiluca. The two kinds of phosphorus first-mentioned require to be exposed to light, either natural or artificial, before they become luminous, and even then the phenomenon is only transitory. The Noctiluca shines without any previous exposure to light. There are three kinds of Noctiluca, viz., constant, liquid, and aërial. The latter is the principal subject of the letter, and an account of its discovery by the author is given. It differs from the other kinds of Noctiluca in that it shines not of itself, but the bare contact of its vapour with air produces a luminous appearance. After recounting numerous observations which he made on the Aërial Noctiluca, Boyle goes on to describe the process whereby he obtained it. Urine is evaporated to a syrupy consistence, the residue mixed with thrice its weight of fine white sand, and the mixture heated in a strong retort until a liquid substance with luminous properties ceases to come over. The vapour of this substance it is which forms the Aërial Noctiluca, when mixed with a minute proportion of air.

J. M.

New Experiments and Observations made upon the Icy Noctiluca. Imparted in a letter to a friend living in the country; to which is annexed a Chymical Paradox. By the Honourable Robert Boyle. 168½.

These new experiments were made on the luciferous substance obtained as described in the last letter, and they resulted in the discovery of the Icy Noctiluca. This body first made its appearance in the form of little particles on the inside of a vial from which

some of the luciferous substance had been emptied, after standing for a long time. Of these particles, Boyle says that "being exposed to the immediate contact of the air, they shone much more vividly than the luminous exhalations were wont to do; and the light being tremulous and twinkling, as well as brisk, they seemed to emulate so many little stars in a cloudless but dark night; and continued this scintillation longer than one would have expected, to the no small delight of the beholders for whose sake the experiment was several times repeated with success." By the characters given by Boyle as those of the Icy Noctiluca, its identity with ordinary phosphorus is established.

The water under which the Icy Noctiluca was kept received its share of attention. On evaporation to dryness a residue of a glutinous nature was obtained, which by absorption of moisture from the air left a liquor almost as strong as spirit of salt. During the evaporation a crackling noise was observed, accompanied by flashes of fire of a yellow colour and very luminous. J. M.

A Chymical Paradox, grounded upon New Experiments, making it probable that Chymical Principles are Transmutable: so that out of one of them others may be produced.

The paradox originated in an observation made by Boyle during the distillation of essential oils for their rectification. In the process a residue was left totally incapable of distillation. Boyle conjectured that this was not simply a more gross part of the oil separated from the pure, but a *new compound*, formed by the action of the fire. The truth of this conjecture was established by numerous experiments on different kinds of bodies, which in Boyle's time were considered to be Principles, and in this way the grand supposition that "what similar body soever is obtained by the action of the fire from a Concrete committed to distillation, was formerly and actually pre-existent in it," fell to the ground. The paradox takes this form—"that from a Chymical Principle, several differing bodies might be obtained by the meer action of the fire." J. M.

A Course of Chymistry, containing an easie Method of preparing those Chymical Medicines which are used in Physick. With Curious Remarks and useful Discourses on each Preparation, for the benefit of such who desire to be instructed in the Knowledge of this Art.

By Nicholas Lemery. Translated from the French by Walter Harris. 1686.

In this book the author first speaks of Chemistry in general, giving the derivation of its name and the objects it has in view. He then goes on to treat of the five *Principles of Chemistry;* of which he says "The word *Principle* in *Chymistry* must not be understood in too nice a sense; for the substances which are so called are only principles in respect of us, and as we can advance no further in the division of bodies; but we well know that they may be still divided into abundance of other parts, which may more justly claim in propriety of speech the name of *Principles*: wherefore such substances are to be understood by *Chymical Principles* as are separated and divided, so far as we are capable of doing it by our weak imperfect powers." The nature of acids and alkalies, various forms of apparatus, and the terms used in Chemistry, are discussed in turn. The first part of the book is devoted to the consideration of minerals. Metals are known from minerals by their "spreading under the hammer." In the chapter on gold, which heads the metals, the author condemns in unmeasured terms the covetousness of those chemists who make the transmutation of the baser metals the only object of their art, and boldly exposes the tricks of others "who wickedly deceive by professing their ability to make gold grow, so that they may obtain money." Under the head of *Niter* are directions for making *Spirit of Niter Dulcified.* In this process equal quantities of spirit of nitre (a strong nitric acid, made by submitting to distillation a mixture of salpetre and clay) and spirit of wine are allowed to stand together until ebullition has ceased, and red vapours are no longer evolved. Every mineral and every preparation of it has its medicinal value properly stated.

In the second and third parts of the book, vegetable and animal substances are treated of respectively. Of the latter vipers are not least important. In the chapter on Phosphorus, honourable mention is made of Mr. Boyle's researches on the Aërial Noctiluca. J. M.

Pharmacopœia Londinensis. Or, the New London Dispensatory. In vj Books. Translated into English for the Publick Good, and fitted to the whole Art of Healing. Illustrated with the Preparations, Virtues, and Uses of all simple Medicaments, Vegetable, Animal, and Mineral; of all the Compounds, both Internal and External; and of all the Chymical Preparations now in Use.

Together with some choice Medicines added by the Author. As also the Praxis of Chymistry, as it's now exercised, fitted to the meanest Capacity. By William Salmon, Professor of Physick. 1696.

The first three books of the Dispensatory contain, in alphabetical order, the simple preparations of Vegetables, of Animals, and of Minerals respectively. Book IV. comprises compounds for external application, and Book VI., the Praxis of Chymistry. This last book includes—The Principles of Chymistry, the apparatus and terms used in the pursuit of the art, and general methods for making the different preparations under the heads, Extraction, Separation, Distillation, and Fixation. J. M.

A Compleat Course of Chymistry, containing not only the best Chymical Medicines, but also great variety of useful Observations. To which are added the Author's Experiments upon Metals, by way of Appendix. By George Wilson, Chymist. 1709.

The course commences with a Table of Chymical Characters. The characters do not merely stand for different substances, but show in some measure their mutual relations, and indicate what is the composition of such as are compound,—foreshadowing very dimly the modern systems of notation. Plates of apparatus and a glossary of terms follow. Metals and minerals, vegetables and animals and insects, are duly treated of in three parts. No preparation fails to receive its share of laud in respect of some particular disease. Elixir of Human Skulls is made by the repeated distillation of skulls until a homogeneous liquid is obtained. The process is repeated with the last distillate and rectified spirit, and the product digested with the "Moss of Human Skulls. It is a noble medicine against Madness, Convulsions, and Hysteric Fits. It operates by sweat and urine."

In the Experiments on Metals is related one by which gold was made to increase. Two scruples and thirteen grains of gold were obtained, with a loss of one dram, one scruple, and seventeen grains of silver. On this the author remarks, "that considering the trouble and expence of the experiment, I believe the reader will agree with me, That this gold was bought a little too dear." J. M.

A new English Dispensatory, in four parts. Containing—I. *A more Accurate Account of the Simple Medicines than any hitherto extant.*—

II. *The Officinal Compositions, according to the last Alterations of the College at London: to which are added the Emendations of the Edinburgh Dispensatory; and many other compositions, taken from the practice of our Hospitals, and the most celebrated Authors.* —III. *Extemporaneous Prescriptions, taken from the best Authors, and the most eminent Physicians now in Practice.*—IV. *A Rational Account of the Operation of Medicines. To which are added the Quantities of the middle syllables of the Latin names, expressed by long and short marks; so that this Dispensatory answers at the same time the purpose of a Prosodia Pharmaceutica. By James Alleyne, M.D.* 1733.

The first part of this book forms a manual of the Materia Medica and Therapeutics of the time in which it appeared. It is distributed under the heads—Fossils, Vegetables, Animals, and Medicines taken from the Human Body. Fossils include Earths, Stones, Salts, Bitumens, Minerals, and Metals. A description of each particular substance is given, and the places where it occurs are fully stated. Plants are mentioned under the order to which they belong; thus Valeriāna is one of those "Plants with one naked seed to each flower, and simple flowers;" a further description of the genus follows, and afterwards the species are mentioned in turn, their preparations given, and properties stated. Cochlearia belongs to those "Plants with seeds in pods, and tetrapetalous flowers expanded in the form of a cross."

The second part treats of the objects of Pharmacy, and of the intention in compounding medicines; following this by recipes for the making of all the different medicines obtained by processes of Extraction, Distillation, Solution, Mixture, etc., for internal or external use.

In Part Four, Therapeutics are treated of more fully than in Part One. Medicines are divided into classes according to their action on the system, and the classes are in turn subdivided for convenience of reference and description. J. M.

A Course of Practical Chemistry. In which are contained all the Operations described in Wilson's Complete Course of Chemistry. With many new and several uncommon Processes. To each article is given, The Chemical History, and to most an account of the Quantities of Oils, Salts, Spirits yielded in Distillation. From Lemery, Hoffman, the French Memoirs, Philosophical Transactions,

and from the Author's own Experience. By William Lewis. 1746.

This book is little more than a slightly extended copy of Wilson's noticed above. The points in which it differs from Wilson's are mentioned in the title. J. M.

The Elaboratory Laid Open; or, the Secrets of Modern Chemistry and Pharmacy revealed; containing many particulars extremely necessary to be known to all Practitioners in Medicine. 1758.

This volume owes its existence to a desire on the part of the author (whose name does not appear), to benefit the public at large by making known to them through its medium, a full view of the methods by which the greater part of the chemical medicines commonly met with were prepared. Having this book, one trading in a confined or extensive sphere need not be under the necessity of reposing implicit confidence in those who make the products he buys and sells.

The introduction to the work explains the structure of furnaces for general and particular uses, and describes apparatus for levigation, distillation, etc., with modifications which have been found advantageous in special cases. In the third section of this introduction, the identity of several substances known under different names in the Materia Medica is established: as "volatile salts from whatever animals or parts of animals they may be produced;" "various spirits from whatever source;" "the acrid spirit obtained from sulphur, vitriol, sal catharticum amarum, and alum."

The second part contains processes for the preparation of chemical medicines; tells of the sophistications to which they are liable, and the means whereby these sophistications may be detected. Lac Sulphuris is prepared by boiling sulphur with one and two-fifths its weight of quick-lime, filtering, and precipitating with oil of vitriol or spirit of salt. The product should sublime on heating without leaving any "recrement or *caput mortuum*."

The third part treats of Galenicals in the preparations of which the college prescriptions are not strictly adhered to.

In the fourth part special adulterations are exposed, and processes given for their detection in each instance. These adulterations and processes differ very little from those employed at the present day. J. M.

Aquarum Natura et Facultates, per quinque Libros digesta; Vinorum et Aquarum effectum invicem comparatorum Tractatus. De Arthritide et Podagra consilium, Pamphili Herilaci Reatini Medici Philosophi. In quibus quæ ipsorum enarrentur index quisquis unus indicabit. Annotationes et Summaria in capitibus omnibus adjecta sunt. Periocham in Tabularum modum congestam omnium Librorum reperies ut undique omnium Specierum Aquarum Facultates absolutissimæ pateant. Coloniæ, Expensis Joann. Bapt. Ciotti Senens. 1591. Pp. 384 and 128.

The author of this work by dint of prolixity and circuitous expression, coupled with the most ostentatious section and subsection of his matter, has succeeded in producing the most tedious little volume it was ever our fortune to look into. He begins by treating of rain, and then you are deluged with water from lake and river, with stagnant and running water, with water filtered and water distilled, with water hot and cold, of every temperature, kind, description, and origin. W. A. T.

Pharmacopœia Londinensis, in qua Medicamenta Antiqua et Nova Usitatissima, sedulò collecta accuratissime examinata, quotidiana experientia confirmata describuntur. Diligenter revisa, denuo recusa, emendatior, auctior. Quarta Editio. Opera Medicorum Collegii, Londinensis, ex Serenissimi Regis mandato. Cum R. M. Privilegio. London. Printed for John Marriott; and are to be sould at his shop, in Fleet Streete, in St. Dunstons Churchyarde. 1639.

The first edition appeared 1618. Pharmacists in these days are wont to complain of the number and diversity of the drugs and preparations they are required to know something about and keep in stock. We advise any so afflicted, to turn over the pages of a Pharmacopœia of two or three hundred years ago: if he is not at once restored to a wholesome condition of contentment, we know of no prescription likely to help his case.

Here are the directions for preparing *Syrupus de Artemisia Matthæi de Gradi*, with the assistance of some forty-eight ingredients. Further on we find the *Antidotum Hæmagogum*, compounded of thirty-seven simples; the *Diasatyrion Magis Gratum*, compounded of thirty-one, and the *Antidotus Magna Matthioli adversus venera et pestem*, the list of ingredients for which fills nearly five columns of foolscap page. We have hardly the courage to count

them; but we have done it. Positively upwards of one hundred and thirty ingredients! And amongst other precious trifles, the compilers have had the coolness to insert Mithridatium, which itself includes fifty different substances, and then wind up with,—"Ex his omnibus summâ diligentiâ et arte conquisitis mundatis et electis, fiat Electuarium," etc.

The celebrated *Theriaca Andromachi* also finds a place in this volume, though we are unable to say if this particular recipe agrees with the original formula. W. A. T.

"*Ecce dedi vobis omnes herbas sementantes semen, quæ sunt.*"—*Gen.* i. 29.

Excideret ne tibi divini muneris Author.

Præsentem monstrat quælibet herba Deum.

The Herball or Generall Historie of Plantes. Gathered by John Gerarde, of London, Master in Chirurgerie. Very much Enlarged and Amended by Thomas Johnson, Citizen and Apothecarie of London. London. Printed by Adam Islip, Joice Norton, and Richard Whitakers. Anno 1633.

In the year 1585, or thereabouts, Master John Gerard (so he inscribes himself in the preface, though the title-page makes it *Gerarde*) "out of a propense good-will to the publique advancement of this knowledge," being minded to impart to his fellow-countrymen some portion of the intimate acquaintance with plants which his wide experience had put him in possession of, betook himself to the compilation of this volume.

It seems from the address to the reader, by the editor of this, which is the second edition, that the original work was published and "printed at the charges of Mr. Norton, *Anno* 1597:" and we are told that "Dodonæus his Pemptades comming forth, *Anno* 1583, were shortly after translated into English by Dr. Priest, a physitian of London, who died either immediately before or after the finishing of this translation;" and that Mr. Gerard took this translation as the basis of his work.

The editor, however, "cannot commend our author for endeavouring to hide this thing from us, cavilling (though commonly uniustly) with Dodonæus, wheresoever he names him, making it a thing of heare-say, that Dr. Priest translated Dodonæus."

The statement of the author himself is in these words. "Doctor Priest, one of our London Colledge, hath (as I heard) translated the

last edition of Dodonæus, and meant to publish the same; but being prevented by death, his translation likewise perished."

Mr. John Gerard "was born in the yeare 1545, in Cheshire, at Namptwich, from whence hee came to this city, and betooke himselfe to Surgerie, wherein his endeavours were such, as he therein attained to be a Master of that worthy profession; he lived some ten yeares after the publishing of this worke, and died about the year 1607." Worthy Master Gerard and his "Herball" encountered, it seems, the handling which many an other earnest and laborious worker, both before and since his time, has fallen in with. Whilst his book is very much enlarged and amended, the author receives in a voluminous and pretentious epistle by the editor, precisely that meed of tempered and much-diluted commendation which is the portion of well-intentioned writers in general. Mr. Thomas Johnson, who addresses the reader in this epistle, seems perfectly well contented with his own share in the performance. Now for the book itself.

We have before us a somewhat corpulent volume in folio, 1631 pages, besides the index.

The title is adorned at the head with figures of Ceres and Pomona: the goddesses are looking in *opposite* directions, and, of course, are provided with appropriate insignia. The former has been designated by the pen of a former possessor of the volume "goddess of frutes;" but a happy thought has induced him to substitute for this "goddess of corne," and award to Pomona the autumnal honours. Theophrastus and Dioscorides, more polite than the ladies, *face* each other below. At the bottom is a portrait, we presume, of good Master Gerard himself, arrayed in ruff and mantle and with the peaked beard and grave visage of his time.

"To the right Honourable his singular good Lord and Master, Sir William Cecil, Knight, Baron of Burghley," etc., the author dedicates his work with all the heartiness and enthusiasm which might well be considered necessary to carry him through so tremendous an undertaking. "If," he says, "delight may provoke men's labour, what greater delight is there than to behold the earth apparelled with plants as with a robe of embroidered worke, set with Orient pearles, and garnished with great diversity of rare and costly jewels? If this varietie and perfection of colours may affect the eye, it is such in herbs and floures, that no Apelles, no Zeuxis ever could by any art expresse the like; if odours or if tastes may worke satisfaction, they are both so soveraigne in plants and so comfortable that no confection of the Apothecaries can equal their excellent

vertue. But these delights are in the outward sences; the principall delight is in the minde, singularly enriched with the knowledge of these visible things, setting forth to us the invisible wisedom and admirable workmanship of almighty God."

Following the dedication are inserted a number of laudatory and congratulatory epistles, mostly in Latin; one is from Matthias de l'Obel, whose system of arrangement is that principally adopted in this work ["nostram novam methodum et ordinem . . . recludis"]: another from George Baker, "one of her Majesties chief Chirurgions in ordinarie," complains bitterly of the tardiness of preferment and reward for learning here in England. After telling how he once saw Mr. Gerard tried against a man highly esteemed in Paris as a herborist, and how they spent one whole day "searching the rarest simples; but when it came to the triall, my French man did not know one to his foure:" he exclaims, "What doth this man deserve that hath taken so much paines for his countrey, in setting out a booke, that to this day never any in what language soever did the like?" And then he groans, "If this man had taken this paines in Italy and Germany where Matthiolus did write, he should have sped as well as he did." After filling half a page with an enumeration of the royal and noble patrons of Matthiolus, "What age do we live in here that wil suffer all vertue to go unrewarded? Master Gerard hath taken more pains than ever Matthiolus in his Commentaries, . . . and yet I doubt whether he shall taste of the liberalitie of either Princ, Duke, Earle, Bishop, or publique Estate. Let a man excell never so much in any excellent knowledge, nevertheless many times he is not so much regarded as a Jester, a Boaster, a Quacksalver, or Mountebanke."

We much fear times are not greatly changed in this respect in this year of grace eighteen hundred and seventy.

"*The First Booke of the Historie of Plants; containing Grasses, Rushes, Reeds, Corne, Flags, and Bulbous or Onion-rooted plants.*

"In this Historie of Plants it would be tedious to use by way of introduction any curious discourse upon the generall division of Plants, contained in Latine under *Arbor*, *Frutex*, *Suffrutex*, *Herba*; or to speak of the differing names of their severall parts, more in Latine than our vulgar tongue can well expresse. . . . In three books, therefore, as in three gardens, all our Plantes are bestowed; sorted as neere as might be in kindred and neighbourhood.

"The first booke hath Grasses, Rushes, Corne, Reeds, Flags, Bulbous or Onion-rooted Plants.

"The second, most sorts of herbes used for meate, medecine, or sweet-smelling.

"The third hath Trees, Shrubs, Bushes, Fruit-bearing Plants, Rosins, Gummes, Roses, Heathes, Mosses, Mushrooms, Corall, and their severall kindes.

"Each booke hath chapters, as for each herbe a bed; and every plant presents thee with the Latine and English name in the title, placed over the picture of the plant.

"Then follows the kindes, description, place, time, names, natures, and vertues agreeing with the best received opinions."

Book the first then corresponds pretty nearly with our modern class of Monocotyledons. On looking through this Lib. I. there is, besides, apparent classification, imperfect it is true, but still sufficient to show that the spirit of the "Natural System" was with our author in his work of compilation.

Nearly all the plants he first treats of are grasses proper (natural order, Graminaceæ), but he afterwards also mentions numerous *Cyperous* grasses, and gives to rushes a separate chapter. The Floure-deluce, of which "there be many kindes," follows, and then Gingers and "Aromatical Reeds." Chapter forty-six commences the description of "Corne and the kindes thereof under the name of Graine." Buckwheat (and other Dicotyledonous plants) are included under this head.

Under Barley we read that "it serveth for Ptisana, Polenta, Maga, Malt, Ale, and Beere. The making whereof if any be desirous to learne, let them read Lobelius Adversaria in the chapter of Barley. But I thinke our London Beere-Brewers would scorne to learne to make beere of either French or Dutch."

Ergot is not mentioned, but under the name of "Burnt Corne" the existence of *smut* is alluded to.

The manufacture of sugar from the cane is described, and from the account given here, it seems that we really have made to the present day very little improvement upon the original crude mode of working. Gerrard refrains from writing of the infinite confections, syrups, and such-like, being beside his purpose to make of his book "a Confectionarie, a Sugar Baker's furnace, a gentlewoman's preserving pan, nor yet an Apothecarie's Shop or Dispensatorie."

Asphodels and Hyacinths, Daffodils and Tulips, "Bulbous Violets" (Snowdrops), and Crocuses, follow together with Colchicums and figures of the corm. Of the last plant the author says, "it bringeth

forth leaves in Februarie, seed in May, and flowers in September, which is a thing cleane contrarie to all other plants whatsoever, for that they do first floure and after seed; but this saffron seedeth first, and foure months after brings forth floures; and therefore some have thought this a fit name for it, *Filius ante patrem.*" Shortly after this comes a chapter on Onions, and not forgetting the Squills or sea-onions. The Lilies are described next; and, last in the book, a considerable number (probably nearly all the British species) of Orchids. The wonder in most of these is the accuracy of their delineation; so that there is no difficulty in recognising at a glance the majority of the most familiar species.

The Second Book of the Historie of Plants; containing the Description, Place, Time, Names, Nature, and Vertues of all sortes of Herbes for Meate, Medicine, or sweet smelling Use, etc.

Under the general heading "Turneps" our author devotes about five-and-twenty pages to the description of plants which fall very naturally together, being without exception *Cruciferous*. But shortly after he breaks into what we should regard as the natural arrangement, by the introduction of Indian Cress (*Tropæolum*) and of several composite and umbelliferous plants. Then again, beginning with Groundsel, he returns to a sequence of plants which are all composites, until we come again to Cabbages and "Cole-florie." Of the Sleepy Nightshade, *Solanum læthale* (Belladonna), we are advised that "the greene leaves may with great advice be used; but if you will follow my counsell, deal not with the same in any case, and banish it from your gardens, and the use of it also, being a plant so furious and deadly."

"Black Henbane" does not now-a-days grow "almost everie where by high-wayes;" but it is not many months since we heard* a story not at all unlike the following: "The seed is used by mountebank tooth-drawers which runne about the countrie for to cause wormes come forth of men's teeth, by burning it in a chafing dish with coles, the party holding his mouth over the fume there of; but some crafty companions, to gain mony, convey small lute string into the water, persuading the patient that these small creeping beasts came out of his mouth, or other parts which he intended to ease."

The art and practice of the use of Tobacco has not been lost since good Mr. Gerard's day: we do not now require to be told that "the

* See *Pharmaceutical Journal*, S. S., vol. ix., p. 233.

drie leaves are used to be taken in a pipe, set on fire, and suckt into the stomacke and thrust forth again at the nosthrils."

Golden Rod "is extolled above all other herbes for the stopping of bloud in sanguinolent ulcers and bleeding wounds; and hath in times past beene had in greater estimation and regard than in these dayes; for in my remembrance I have knowne the dry herbe which came from beyond the sea sold in Bucklers Bury, in London, for halfe a crowne an ounce. But since it was found in Hampstead Wood, even as it were at our townes end, no man will give halfe a crowne for an hundredweight of it; which plainly setteth forth our inconstancie and sudden mutabilitie, esteeming no longer anything how pretious soever it be, than whilst it is strange and rare. This verifieth our English proverbe, 'Far fetcht and deare bought is best for Ladies.'"

The remainder of this book is occupied by the very numerous labiates, composites, umbellifers, and leguminous plants, which, abounding everywhere, necessarily occupied much of the attention and labour of our author. "There's rosemary, that's for remembrance; and there is pansies, that's for thought. There's fennel for you and columbines; there's rue for you; we may call it herb-grace o' Sundays." "Violets dim," "pale primroses," and "bold oxlips." Here is a long dissertation concerning the Vine, and treating of Grapes; of Raisins; of Must; of Lute (Boyled Wine); of Wine; of the liquor which is distilled out of Wine, commonly called, Aqua Vitæ; of Argall, Tartar, or Wine Lees. "Almighty God for the comfort of mankinde ordained Wine; but decreed withall, That it should be moderately taken, for so it is wholesome and comfortable; but when measure is turned into excesse, it becommeth unwholesome and a poyson most venomous; . . . besides, how little credence is to be given to drunkards it is evident; for though they be mighty men, yet it maketh them monsters and worse than brute beasts. Finally, in a word to conclude; this excessive drinking of Wine dishonoureth Noblemen, beggareth the poore, and more have beene destroyed by surfeiting there with, than by the sword."

The very appropriate sequel to this discourse is a chapter on Hops: but as in token of the small respect in which they were held in Gerard's time, he gives but a page to their description, adding, however, at the end, that "the manifold vertues of Hops do manifestly argue the wholesomenesse of beere above ale."

The Third Booke of the Historie of Plants; containing the Description, Place, Time, Names, Nature and Vertues of Trees, Shrubs, Bushes, Fruit-bearing Plants, Rosins, Gums, Roses, Heath, Mosses; some Indian Plants, and other rare Plants not remembered in the Proeme to the first Booke. Also Mushrooms, Corall, and their severall kindes, etc.

All through this book, as in the two former, the illustrations are such as we can only wonder at for their general accuracy. From the desire to give a view of the entire plant, it arises in many cases that the figures give one the impression of images seen in a bent mirror: they are so much shortened. The author was probably unacquainted with the works of Cæsalpinus, or he might have adopted his system of classification; and evidently either knew nothing more of vegetable structure than his neighbours, or attached to it no importance. There is not throughout the entire volume a single diagram or description of the internal organs of a flower or other parts. The third book concludes with an account of the Goose Tree, Barnacle Tree, or tree bearing geese. You have first a drawing of the barnacles attached to a piece of wood, with a view of the goose supposed to be hatched from them; with the following memorandum, in manuscript, by some curious and wondering student:—

"'Twas first a greene Tree,
Then a gallant Hull,
Lastly a Mushroom,
Now a flying Gull."

Gerard's editor and commentator, after giving the author's own account of this supposed *lusus naturæ*, explains in a note that the "shells out of which these birds were thought to fly, are a kinde of *Balanus marinus*," adding the asseveration of Fabius Columna; "*Chonchas vulgò Anatiferas non esse fructus terrestres, neque ex iis Anates oriri; sed Balani marinæ speciem.*" Mr. Gerard is not the only natural history student who has mistaken the designs and purposes of Nature. How many years have elapsed since we believed as firmly as he did that corals and sponges were undoubted vegetables, and had faith in *polygastric* animals with revolving stomachs? To this day the fable of the sailing nautilus is gravely inserted in books intended for instruction.

"And thus having through God's assistance discoursed somewhat at large of Grasses, Herbes, Shrubs, Trees, and Mosses, and certaine Excrescences of the earth, with other things moe, incident to the historie thereof, we conclude and end our present Volume, with this

wonder of England. For the which God's name be ever honored and praised."

With these reverent words of the author we close the book.

P.S.—One characteristic of this interesting author, and which cannot fail to endear him to all antiquarians, is the quaintness of his English. Many of the words he uses cannot be said exactly to be his, because they are occasionally met with in works of an earlier date; but they are employed so appositely, and at the same time with such a sort of relish as one cannot help partaking of. What a capital word is "stamped:"—he uses it all through the book as we use pounded or bruised. But his adjectives are the best. One flower has an "overworne blew," another an "overworne russet" colour; whilst some plants are "poisonsome," and others "oileous." How sensitive old Gerard was about the nose we may judge by the variety and *pungency* of his names for distinguishing odours. He compliments one of his herbs for its "prettie spicie smell;" another he commends for its "delectable or amiable" odour. On the other hand, there are some which tickle him less agreeably; those are "rank and grievous," they have a "naughtie savor," or do engender "naughtie and sharpe blood."

One word about another character, which however cannot be called characteristic,—the spelling. Before the publication, long after this time, of Dr. Johnson's dictionary, orthography had been altogether "unsettled and fortuitous." Gerard gives us abundance of illustrations of this. He is however indebted to his editor, Thomas Johnson, for a number of alterations in this respect. On the first page of the original work we have *toong* and *gesse;* they are "improved" in this edition into *tongue* and *guesse.*

To supply the apology due for so lengthy a notice of this most delightful Herbal, the writer takes the liberty of quoting an author of the last century. "I shall conclude with observing one thing in my favour, which is, that I have not added to the multiplicity of bad books, but endeavoured to introduce a known good one to a larger acquaintance, and make it more extensively useful, by rendering it more familiar, complete, and intelligible."—*Dr. Swan,* 1753.

W. A. T.

Occult Physick, or the three Principles in Nature Anatomised by a Philosophical Operation, taken from Experience in three Books. . . . The First of Beasts, Trees, Herbs, and their Magical and Physical Vertues. The Second Book containeth most Excellent and

Rare Medicines for all Diseases happening to the Bodies both of Men and Women, which never yet saw Light; An Incomparable Piece. The Third and Last Book is a Denarian Tract, shewing how to cure all Diseases with ten Medicaments; and the Mystery of the Quaternary and Quinary Number opened; with a Table shewing the Sun's Rising, Setting, Hours of the Day, Hours of the Night, and how many Minutes are contained in a Planetary Hour both Day and Night; with a Table of the Signs Continuance on the Ascendent, fitted for Magical Uses; As Gathering of Herbs, Roots, and the like, with their Uses. Whereunto is added a necessary Tract, shewing how to Judge of a Disease by the Affliction of the Moon, upon the sight of the Patient's Urine, with an Example; Also you are taught how to Erect a Figure of Heaven for any time given. By W. W. Philosophus; student in the Celestial Sciences. London: Printed by Tho. Leach, and are to be sold by W. Palmer, at the Palm Tree, near St. Dunstan's Church in Fleet Street. 1660.

"W. W.," or William Williams, of Gloucestershire, Philosophus, the author of this work, entertained no mean opinion of the value of his labours, assuring the "ingenious reader" that "in what he had done he has been as faithful as it is possible for mortal man to be;" and again declaring that "after ages will be engaged to praise the Lord for evermore, that this Book was ordained for the light." Nor was he apparently singular in this view; for his friend John Goode, "student in astrology," exhorts him, in a commendatory epistle, to continue to "bring forth of his store things new and old, and not to be weary in well doing," though "ignorance may despise thy labours and spare not."

Of the "vertues" ascribed to beasts and plants, the following may serve as a sample: "Take a great Toad, kill him and put him into a Horse Dunghill, there let him lie, and the ants will consume the flesh; in the head you shall find a thing like a stone, great or little, the which being set in Gold, and worn about a man, it doth give him warning of any mischief or ill to him that weareth it, by changing colours in divers manners." So again, W. W. declares that if you "take a cluster of Quickbane (or Wild Ash) Tree berries, and convey them about the party suspected to be a Witch, and then examine her, she shall confess;"—which seems hard if the suspicions were unfounded, and she happened to be innocent.

Though a large number of W. W.'s prescriptions are for physical ills, yet it is evidently on his magical and astrological skill that he

rests his claims to the gratitude of posterity. He thus explains the scope of the "Denarian Tract," which forms the third portion of the work: "The Denary or number Ten, is the highest number according to the largest extent of Nature; for the number Five being the Spirit or Quintessence, joined with its body, the number Four, or the four Elements made pure, out of this number Nine, or by the conjunction of Four and Five, the sum of perfection is brought forth, which is the number Ten." "Some," observes W. W., "will say this is a high obscure speech." "Others," he quaintly adds, "will say it is nonsense." But undeterred by any such adverse opinion, he proceeds to treat of the "Ten Medicaments, whereby any curable disease is healed," and then gives various astrological tables for medical use.

It is not, of course, easy to discuss these astrological specifics entirely without a smile. And in the case of "W. W.," who was a somewhat belated astrologer, and confesses that "this kind of Learning" was "much a stranger amongst the men of his day," perhaps even more than a smile may be pardoned. But still it should not be forgotten how long and intimately astrology and alchemy were blended with what we should now call legitimate science, and how much they influenced the minds of really great men; and thus we shall look upon them, not with scorn, not even patronizingly, but as an interesting phase in the history of our knowledge of Nature.

F. T. M.

Galeno-pale; or a Chymical Trial of the Galenists, that their Dross in Physick may be discovered. With the grand Abuses and Disrepute they have brought upon the whole Art of Physick and Chirurgery, in their Method touching Phlebotomy and Purgation. Their vain Curiosity in Anatomy reprehended; and their false Rule of Contraries in the Cure of Diseases manifested. Also, a full Answer to the Objections charged by the Galenists against the Chymists and Chymical Medicines vindicated. To which is added an Appendix, De Litho-Colo; or an History of Three large Stones excluded the Colon by Chymical Remedies. By Geo. Thompson, Medicinæ Doctor. φάρμακα πολλὰ μὲν ἐσθλὰ μεμίγμενα, πολλὰ δὲ λυγρᾶ. *Homer, Odys.* πὰν τὸ ἔργον τῷ πυρὶ δοκιμασθήσεται *London, printed by R. Wood, for Edward Thomas, at the Adam and Eve, in Little Britain.* 1665.

Bound up with this is—

ΠΛΑ'ΝΟ ΠΝΙΤΜΟ'Σ; *or a Gag for Johnson that published Animad*

versions upon Galeno-pale, and a Scourge for that pitiful fellow Mr. Galen, that dictated to him a Scurrilous Greek Title. By Geo. Thompson, Doctor of Physick, London. Printed by R. Wood, for Edward Thomas, at the Adam and Eve, in Little Britain. 1665.

The title of this book explains sufficiently its object and character. It is simply one of those productions arising out of the violent controversies which agitated the medical world till a hundred and fifty years later; and in which both sides did not scruple to call each other very hard names. In Chapter III., complaining of the "abuses and disrepute the Galenists have brought upon Physick," the author exclaims:—"What, we pray, should our city have done, if some Epidemical Contageous Disease, as the Plague, had reigned amongst us?" In a very short time after, he had opportunity of gaining information on this point, for it was in the autumn of the very year in which this dissertation appeared that the great Plague broke out. W. A. T.

Every Man his own Doctor. Shewing how every one may know his own Constitution and Complection by certain Signs. Also the Nature and Faculties of all Food as well as Drinks. Whereby every Man and Woman may understand what is good or hurtful to them. Treating also of Air, Passions of Mind, Exercise of Body, Sleep, Venery, and Tobacco. Written by John Archer, Chymical Physitian in ordinary to the King. Felix que potuit rerum cognoscere causas.

[*London: Printed by Perer Sillicrapp for the authour, and are to be sold by most Booksellers.* 1671.]

"READER.

"Having not leasure to amend the faults of the printer,—

Erratas there are from pen and press
Which love may hide and thine will seem the less.

From my house in Winchester Street, near Gresham Colledge, next door to the Fleece Tavern."

Once the Rev. Thomas Binney preached from the following passage:—"And come and follow me—*But.*" He said a lady was asked what the sermon was about; she replied, the text was the sermon. So here, the title page is the book, and with it the interest ends. The treatise never rises out of platitude, nor has it the merit of being quaint. It discourses about the seasons, meats and foods,

such as beef, veal, mutton and lamb, fowls and fish; and with regard to eggs we get this information: "The newest eggs are the best, and nourish most and soonest, and yield good aliment; but the stalest are the worst, and the corruption of eggs is most dangerous." A long chapter on fruit and vegetables precedes a mild account of wines and waters. The latter are to be thus corrected:—

"Waters are corrected by boyling, and their conditions and malignancies are abated, and the terene and vitious parts are separated, which will settle in the bottom when they are cold." Coffee, perhaps, forms the most distinctive passage in the book. "Lastly, since of late coffee is grown so much into use, it will not be amiss if we touch upon the quality of it. In its nature it is cold and dry, binding: it doth very much sympathize in vertue with pease, only it hath this quality above pease, that it will make him that drinks it vigilant, for it doth very much hinder sleep, and therefore good in a lethargy, but bad to be drank near bedtime by those that cannot sleep well; it doth potently resist drunkenness, which makes many after hard drinking refresh themselves with it; and as it is drank actually hot, and being in itself potentially cold, it is innocent, working no wonders but one, viz., it hath made many poor people by selling it, become very rich."

The rest may be passed over till we come to the second part, where John Archer falls foul upon all other practice but his own. Physicians, it appears, read Galen, Hippocrates, Diascorides, Actuarius, Rasis, Serapio, Ætius, Averoes, Hurnius, Fernelius, Senertus, Riverius, *cum multis aliis;* they go to Italy and visit the universities, but they are not up to the standard of John Archer. "Whilst mere Methodists (observe the use of the word) are sufficiently satisfied when they can say, *sic dixit Galenus vel Hippocrates*, we can with more comfort say, *experientia docet*, for experience is the mistress of knowledge, and the best knowledge is taken from experience."

So disinterested is our author, that, having set down certain and safe ways of government, he has invented a few choice remedies; these might be improperly prepared, so with tender solicitude for the welfare of mankind, "I will not entrust any to prepare them, nor the delivery of them from my own house, and there only delivered; for the best medicine not well and truly prepared, may make a failing in cure." We are not startled, therefore, when recommended to purge with "our Morbus pill." "Take, I say, in bed, and sleep after, the first night three pills, next night four pills; and if thy strength is sufficient, which you will find by taking the two first

doses, take the third day five pills." Wind up with "our cordial dyet drink," which has this advantage, "that it doth corroborate and fortifie the noble parts of the body." It is somewhat remarkable that our dyet drink and morbus pills are applicable in many cases, which shows the skill with which they have been compounded; but some acute diseases require further aid. This is how to cure the ague:—

"First take two or three of our vomiting pills in the morning; then at night take of our cordial dyet drink half a pint hot every night and morning, sweating upon it every time, and forbear drinking of beer or ale for four days, taking this drink at meat and else; and take also three of our corroborating pills, every morning for a week together, early stirring after them, it will free your body with ease and safety. Avoiding the violent sweats the Jesuits' powder doth commonly bring upon all that take it." But in the seventeenth century they did not vomit or corroborate or take their morbus pills free of all expense.

"Our cordial dyet drink is 2*s.* 6*d.* the quart; our morbus, 5*s.* a box; our corroborating pills, the same; a box of our vomit pills, containing twenty, is 3*s.* Moreover we have a cordial pill giving ease in an hour, and frees thy body from the greatest pain. Its price is 12*d.* each pill, there being three in a box, is 3*s.* price. These pills and dyet drink are so well known by all that have used them for their excellent vertues, that they need nothing of pen praise; their benefit in use will show their worth, and to be had only from my house in Winchester Street, near Gresham Colledge, next door to the Fleece Tavern." The name of the hostelry is significant. J. I.

The Royal Pharmacopœia, Galenical and Chemical, according to the practice of the Most Eminent and Learned Physitians of France, and published with their several approbations. By Moses Charras, the King's Chief Operator in his Royal Garden of Plants. Faithfully Englished. Illustrated with several Copper Plates. London: printed for John Starkey, at the Miter within Temple Bar, and Moses Pitt, at the Angel, in St. Paul's Church-Yard. 1678.

This is a very complete treatise on Pharmacy. The first part enters into a full description of a great number of pharmaceutical and chemical operations, including the construction and use of furnaces. The second part describes the manner of concocting all kinds of galenical preparations, including a few that we now should think

rather nasty. Such are powder of vipers, oil of earthworms, oil of scorpions, oil of lizards. Fastidious people too might think it cruel to plunge, according to directions, the *live* ingredient into scalding oil.

The first forty-six chapters of the third part of the book are devoted to distillations, the remainder to extracts, waters, and the preparation of various metallic salts. Among other chemical preparations are some much commended which have for basis human skull, blood, or urine; vipers, toads, frogs, earthworms, emmets, peacocks, etc. In the fourth part of the book we have a collection of recipes, amongst which, whatever its value, an "Ointment to catch Fish," compounded of man's and cat's fat and powdered mummy, can hardly be thought to hold a fitting place in a Royal Pharmacopœia.

W. A. T.

The English Physitian enlarged; with Three Hundred, Sixty and Nine Medicines, made of English Herbs, that were not in any impression until this; being an Astrologo-Physical Discourse of the Vulgar Herbs of this Nation; containing a Compleat Method of Physick, whereby a Man may preserve his Body in Health, or Cure himself being Sick, for Three-pence charge, with such things only as grow in England, they being most fit for English Bodies. Herein is also shewed these seven things, viz.:—1. *The Way of making Plaisters, Oyntments, Oyls, Pultisses, Syrups, Decoctions, Juleps, or Waters of all sorts of Physical Herbs, that you may have them ready for your Use at all times of the Year.*—2. *What Planet governeth every Herb or Tree (used in Physick) that groweth in England.*—3. *The Time of gathering all Herbs, both Vulgarly and Astrologically.*—4. *The Way of Drying and Keeping the Herbs all the Year.*—5. *The Way of Keeping their Juyces ready for use at all times.*—6. *The Way of Making and Keeping all kind of Useful Compounds made of Herbs.*—7. *The Way of Mixing Medicines according to Cause and Mixture of the Disease and Part of the Body Afflicted. By Nich. Culpepper, Gent., Student in Physick and Astrology. London: printed for George Sawbridge, at the Bible on Ludgate Hill.* 1681. Small 8vo., pp. 285.

This book had, even long after it was published, a great reputation. It contains, as explained in the title, an account of a great number of English plants. It may be doubted whether the opinion that such are best for *English* bodies gained much hold upon English minds, either before or since the date of this production. Gerard,

eighty years before, complains that the "golden rod" was held in much favour, and fetched almost any price, till one fine day it was discovered growing plentifully in Hampstead Wood. The passion for foreign remedies has certainly descended to this our day, or we should have the pages of our Pharmacopœia relieved of such cumbersome inutilities as sumbul and senega, sarsa and matico, bael and bebeeru, whose most eminent recommendation is that they reach us from afar. Culpepper had probably well studied the Herbal of Gerard; he quotes from him, and many of his descriptions, not only of herbs but of their "vertues," look very much like transplantations from the pages of Gerard to his own. But Culpepper was a diligent student of astrology whilst Gerard was absolutely innocent of everything of the kind; at any rate he exhibits no symptoms of astrological tendencies in his Herbal. This brave old fellow had a perfume of the fields about him. We can imagine him in doublet and cloak of sober hue, but fresh and neat withal, cane in hand, perambulating his pretty garden in Holborn, or down in the meadows at Knightsbridge and about Fulham. But an astrologer!—the very name suggests nothing but fantastic horrors. W. A. T.

Actorum Laboratorii Chymici Monacensis seu Physicæ Subterraneæ Libri Duo, quorum Prior profundam subterraneorum genesin, nec non admirandam Globi terr-aque-aërei super et subterranei fabricam; Posterior Specialem Subterraneorum Naturam resolutionem in partes partiumque proprietates exponit. Accesserunt sub finem mille hypotheses seu mixtiones Chymicæ, antehac nunquam visæ; omni, plus quam mille experimentis stabilita, sumptibus et permissu Serenissimi Electoris Bavariæ, etc. Domini sui clementissimi elaboravit et publicavit Joh. Joachimus Becherus, Spirensis Med. D. Sacræ Cæs. Majestatis Consiliarius nec non Serenissimi Bavariæ Electoris Aulæ Medicus. Francofurti: Imp. Mauritii Georgii Weidmanni. Anno 1681. 8vo, pp. 810.

The first two sections are devoted to an explanatory and critical commentary upon the Mosaic Genesis. The remainder treats of the three mineral principles recognised under the alchemical names, *Salt*, *Sulphur*, and *Mercury;* of mixtures, putrefaction, fermentation, and the interactions of metals and minerals. Two supplements are added. The first describes a new chemical experiment by which iron is produced from common clay, and any kind of fat "sine ullis aliis materiis." The second is a collection of chemical essays by the same author, showing the truth and possibility of transmuting

metals into gold. The author's own words will communicate most concisely the nature of his discourse:—

"Finis Alchymiæ est Mercurius, medium est Mercurius, principium est Mercurius." Mercury from beginning to end. W. A. T.

Collectanea Chimico Curiosa, quæ veram continent Rerum Naturalium Anatomiam sive Analisin e Triplici Regno tam Vegetabili Animali quam et Minerali unde generosa hactenus a Neotericis huic inde tradita resultant et traduntur Medicamina, adversus omnes corporis morbos, cum Usu simul et applicandi modo accurate adjecto Opera et Studio. J. D. Thom. A. Francofurti, apud viduam Hermanni à Sande. 1693. Pp. 927.

This is a collection of pharmaco-therapeutical essays. Though containing a great number of really useful and sensible observations, it is deeply tinged, as were all works on medicine of that date, with that superstition which is always attendant upon ignorance.

The work is divided into nineteen chapters, which are subdivided into numerous sections. Some of them, such as those headed *Hydræleologia Tartarologia Saccharologia*, treat of waters, oils, of preparations of tartar, of sugar, and the like. Tract the fifth gives you "*Septem Planetarum terrestrium explicatio*," dated from the Hague, 1613; and you learn from it not only why gold, silver, iron, quicksiver, tin, copper, and lead are called respectively Sol, Luna, Mars, Mercurius, Jupiter, Venus, and Saturn, but also how several of their more important compounds may be prepared. The following extract, setting forth the analogies between gold and the sun, will give an idea of the general style.

"Primo mane exorto solis jubare, princeps ille planetarum si e terra vapores non sunt impedimento, vultum suum croceum et lucidum, sub vesperam autem rubrum mundo intuendum et observandum exhibet. Haud secus sol terrestris aquâ regiâ solutus, croceo velamine amictus per totum vitrum flavissimum colorem et pelludum intuentium oculis objicit et vero si progrediare ad menstruum extrahendum sub vesperam purpureum colorem videbis. Jam autem si ad umbilicum opus perducas et aucto igne universam humiditatem extrahas priorem auri flavissimum colorem perspicies; quam rem solis ortum, labore nocturno peracto, appellare licet."

In the "Tractatus de Paste" we are told that the causes of atmospheric infection are both celestial and terrestrial. By celestial we are to understand "malas influentias planetarum." Among sublu-

nary causes are unusual heat followed by great moisture, likewise a frequently prevailing south wind. To these are to be added "aquæ corruptæ stagnantes," "cloacæ publicæ," "fœtida quoque exhalatio cadaverum non sepultorum," "maxima hominum congregatio," and so on. What a pity they did not look more after these "causas inferiores," instead of gazing in the air for the "cometes, jaculum, et aliæ figuræ ardentes," and all the rest of the "prognostica." Later in the chapter, directions are given concerning exercise and rest, diet, and the use of the bath, which would probably be of more service than all the elixirs, antidoti, rotulæ, or diahyacintha, put together.

Among the curiosities of the book is the "Extractum Mumiæ," the directions for which, rendered into English, become something like the following:—

Take of the mummy of a healthy man, either hanged or broken on the wheel, that is of the flesh of the thighs, arms and other parts, q. s. This, having been once exposed to the rays of the moon and sun, cut into small pieces and sprinkle with powdered myrrh or a little aloes; afterwards macerate twice for some days in tincture of elder or juniper. Dry the pieces in the air, exhaust them with spirit of wine, distil off the spirit, and you have the extract remaining.

Further on, in the chapter entitled "Exegesis Chymiatrica" (1617), is inserted a description, with woodcuts, of the laconica, or hot air or vapour baths.

In the Tractatus Secundus of Angelus Sala are given two methods of preserving vegetable juices. The expressed juice is to be heated to boiling and strained, and then, according to the first plan, bottles are to be filled to the neck with the clear liquid, and olive oil poured upon the surface (*Quid dices ad hæc?* adds the author). According to the second plan the clarified juice is mixed with strong spirits of wine, allowed to deposit, and then filtered.

The last chapter (date 1649) contains the composition and formula of a precious antidote and other medicines, the work of Angelus Sala, whose name has already been mentioned.

W. A. T.

Pharmacopœia Bateana; or, Bate's Dispensatory. Translated from the Last Edition of the Latin Copy published by Mr. James Shipton, containing his Choice and Select Recipes, their Names, Compositions, Preparations, Vertues, Uses, and Doses, as they are Appli-

cable to the whole Practice of Physick and Chirurgery. The Arcana Goddardiana and their Recipes interpos'd in their proper Places, which are almost all wanting in the Latin Copy. Compleated with above Six hundred Chemical Processes, and their Explications at large, various Observations thereon, and a rationale upon each Process. To which are added Dr. Goddard's Drops, Russel's Pouder, Rabell's Styptick Pouder, Tinctura de Sulphure Metallorum, and the Emplastrum Febrifugum. The Second Edition, with Emendations, and enlarged with several Extraordinary Preparations not in the former impression, and above a Thousand other additions interspersed through the body of the Work. By William Salmon, M.D. London. Printed for S. Smith and B. Walford, at the Prince's Arms in St. Paul's Churchyard. 1700. 8vo, pp. 747.

The preface tells us that "the Original Author of this book was the Eminent and Learned Dr. Bate, a Man who in his Station had been Physician to Two Kings of England and a Protector?" *

This work, as sufficiently explained by the title, is a collection of recipes. Turning to the vaunted Goddard's Drops we find that this "is the true medicine which was purchased of the Doctor by King Charles the Second, so much famed through the whole kingdom, and for which he gave him (as it is reported) many hundred pounds sterling;" also that it is a product of the distillation of Humane (*sic*) Bones or rather Skulls well dried. Russel's Powder is a compound similar to the Sulphurated Antimony.

W. A. T.

The Monthly Miscellany: or Memoirs for the Curious. Occasionally containing Divinity and Law, Philosophy, Moral, Natural, and Experimental Mathematics in its several Branches, Physick, Chymistry, Surgery, Anatomy, and Botany. Epitome of Books and News. The Lives and Characters of famous Persons as well Living as Dead. Letters on Several Subjects with a diary of Material Occurrences, History, Travels and Poetry, Husbandry and Trade. Vols. I. and II. By Several Hands. London: Printed for J. Morphew, near Stationers-hall. 1707-1708.

The numbers for June and July, 1708, contain a paper entitled "Mr. John Ray his Method of English Plants illustrated; in a Letter to Mr. S. D." Ray's *Methodus Plantarum Nova* was published in 1682.

* To Charles I., when he held his court at Oxford, and afterwards to Cromwell, and to Charles II.

Primitive Physick; or an Easy and Natural Method of curing Most Diseases. By John Wesley. Homo sum: humani nihil a me alienum puto. Bristol: Printed by William Pine, in Narrow Wine Street; and sold at the New Room, in the Horse-Fair; and at the Foundery, near Upper-Moor-Fields, London. 1762.

This was the book that afforded so much amusement to Robert Southey, who with the most good-natured pleasantry, reviewed its contents. He recounts how the laborious evangelist, wearied with his efforts, retired to a friend's house and applied a certain plaister, the healing merits of which he subsequently described in terms of extreme laudation. Southey was inclined to think that cessation from apostolic work, and needed rest, should have had their share of credit in the cure effected.

The chief interest of the treatise lies in the preface, some passages of which have become household words in the community which the writer founded. Wesley first states that man before the fall was in perfect health; he was in harmony with nature—nature at peace with him. Then came sin, and disease followed in its train; but great remedies are provided of which temperance and exercise are chief. Physick was at first traditional, the father handing down his observations to the son; or else these stores of knowledge remained in the keeping of the elders. Further advance was made by what is termed accident: a man walking in a grove of pines finds out the use of the natural exuded gum, just as in later times the value of Peruvian bark was brought to light. Eventually hypothesis dethroned experience, theories sprung up, and the science of medicine was established. Physicians were held in honour, and profit attended their employ; hence the wish to shroud their art in mystery, to talk splendid darkness about astrology and astronomy, and to keep the profane vulgar at a distance. "Yet there have not been wanting from time to time, some lovers of mankind who have endeavoured (even contrary to their own interest) to reduce Physick to its antient standard: [they have shewn] that every man of common sense (unless in some rare cases) may prescribe either to himself or his neighbour, and may be very secure from doing harm, even where he can do no good. Even in the last age there was something of this kind done, particularly by the great and good Dr. Sydenham."

"Without any regard to this, without any concern about the obliging or disobliging any man living; a mean hand has made here some little attempt toward a plain and easy way of curing most diseases. I have only consulted herein experience, common sense,

and the common interest of mankind." Such is the intention of the book. In its day it commanded a large sale, though it will scarcely bear the test of modern investigation. The author started with two inestimable blessings: a comfortable appreciation of his own abilities, and thorough confidence in himself. It seems that full allowance being made, the perusal of the directions will create a feeling of disappointment. The following sentence has been often quoted. "The love of God, as it is the sovereign remedy of all miseries; so in particular it effectually prevents all the bodily disorders the passions introduce, by keeping the passions themselves within due bounds. And by the unspeakable joy and perfect calm, serenity and tranquillity, it gives the mind, it becomes the most powerful of all the means of health and long life." The idea is twice repeated. "In uncommon or complicated diseases, or where life is more immediately in danger, I again advise every man without delay to apply to a physician that fears God." In his third preface, Wesley used a word that has been a motto ever since throughout the Methodist connexion—to remedies the effects of which he had himself observed, he added "*tried*." Also he insists on the application of electricity as a remedial agent: in the Appendix, no less than 37 diseases are declared to yield to its influence.

The collection of receipts are more curious than useful; they are not equal to the average of such compilations. "*For an Ague.* 8. Make six middling pills of cobwebs. Take one a little before the cold fit: two a little before the next fit: the other three, if need be, a little before the third fit. I never knew this fail. *Cholera Morbus.* 131. Drink two or three quarts of cold water, if strong; of warm water, if weak. 132. Or, boil a chicken an hour in two gallons of water, and drink of this till the vomiting ceases." This would excuse the man, who during the outbreak of this pestilence at Paris, sold half-ounce bottles of distilled water at a franc a-piece, upon the Pont-Neuf.

We next come to Dr. Dover's successful treatment of Consumption. "Mr. Masters, of Eversham, was so far gone that he could not stand alone. He was advised to lose six ounces of blood every day for a fortnight, if he lived so long; and then every other day; then every third day; then every fifth day, for the same time. In three months he was well. *Tried.*"

Wesley, however much the above may be called in question, describes three eye-waters, the third of which is prescribed occasionally now; and we wonder that in these days of advertisement no one has brought it out as a patent medicine. Moreover it is efficacious, and

to it we can add, *tried*. The first is—"303. Heat half an ounce of Sapis Calaminaris red hot, and quench it in half-a-pint of French white wine, and as much white Rose Water: then pound it small and infuse it. Shake the bottle when you use it. It cures soreness, weakness, and most diseases of the eye. I have known it cure total blindness."

The form still used is—"305. Boil very lightly one spoonful of white copperas scraped, and three spoonfuls of white salt, in three pints of spring water. When cold, bottle it in large vials without straining. Take up the vial softly, and put a drop or two in the eye morning and evening." To the surprise of the writer of these lines, he has been in the habit of preparing an eye-lotion without being aware that he was indebted to Wesley's pages for its origin. "306. An eye-water which was used by Sir Stephen Fox, when he was 60 years of age, and could hardly see with the help of spectacles; but hereby in some time recovered his sight, and could see to read the smallest print without glass or spectacles, till above 80. Take six ounces of rectified spirit of wine, dissolve it in one drachm of camphor; then add two pugils of dried elder flowers. It is used as an embrocation for the forehead and eyelids."

Powdered Assarabacca is *Major's* snuff. We pass over a large quantity of receipts, expressing astonishment that they should have found favour. The gout is to be cured by the application of a raw lean beef-steak (368); while for the iliac passion, Sydenham orders a live puppy to be held constantly on the belly (431)—a singular mode of giving bark; while rupture in children (588) is treated by boiling a spoonful of egg-shells dried in an oven, and powdered, in a pint of milk to three quarters of a pint. Feed the child constantly with bread boiled in this milk. What shall we say when for green sickness, we are gravely instructed to take an ounce of quicksilver every morning; while for twisting of the bowels, one, two, or three, pounds of quicksilver in water, are suggested. Our age has taught us better things.

Experience and common sense are the handmaidens of abstract science. Wesley forgot that though a rudder may be a most sensible invention, it requires a skilful hand to guide it. Nevertheless, he can well forgive a passing smile, for there is no man who has lent a stronger impulse to religious intelligence and activity than the author of "Primitive Physick." J. I.

Galeno-pale: or a Chymical Trial of the Galenists, that their Dross in Physick may be discovered. With the grand Abuses and Disrepute they have brought upon the whole Art of Physick and Chirurgery, in their Method touching Phlebotomy and Purgation. Their vain Curiosity in Anatomy reprehended; and their false Rule of Contraries in the Cure of Disease manifested. Also, a full Answer to the Objections charged by the Galenists against the Chymists and Chymical Medicines vindicated. To which is added an Appendix, De Litho-Colo: or an History of Three large Stones excluded the Colon by Chymical Remedies. By Geo. Thompson, Medicinæ Doctor. φάρμακα πολλὰ μὲν ἐσθλὰ μεμίγμενα, πολλὰ δὲ λυγρὰ. Homer. Odys. πᾶν τὸ ἔργον τῷ πυρὶ δοκιμασθήσεται London, printed by R. Wood, for Edward Thomas, at the Adam and Eve, in Little Brittain. 1665.

It is not very easy, through the strong language in which this work abounds, to discover what was the precise difference of principle by which the author held himself to be separated from the Galenists. But his main charges against their practice are a constant recourse to "Phlebotomy," which he considers was originally "suggested without doubt by that sworn enemy to mankind the Devil;" and to "Purgation." Of the former he remarks: "Away then with this detestable lavish Phlebotomy, that hath destroyed more than Tobacco or the Sword together; may it be banished the Court, City, and Countrey, nor ever be depended upon hereafter, in this Island, or any of His Majesty's Territories, for the cure of any difficult disease; but let it be confined and inflicted as a seral Plague upon all those that delight in Blood, and hate our Gracious Sovereign, and all his loyal Subjects." F. T. M.

A Touchstone for Gold and Silver Wares; or a Manual for Goldsmiths, and all other Persons, whether Buyers, Sellers, or Wearers of any manner of Goldsmith's work. Discovering the Rules belonging to that Mystery, and the Way and Means how to know Adulterated Wares from those made of the True Standard Alloy; and what are the True Weights appointed for Weighing the same. Together with the several Statutes now in Force for Regulating Abuses committed in that Craft. And the Charter of the Goldsmith's Incorporation taken from the Record and truly rendered into English. To which is annexed the Laws in Force against Brass Hilts, and Brass Buckles, &c. And Directions for Discovering the Counterfeit Coyn of this Kingdom. And also a Catalogue of the Forraign Coyns,

with the particular Weights, Alloy, and Value of each Coyn. By W. B., of London, Goldsmith. London: Printed for John Bellinger, in Clifford's-Inne Lane, and Thomas Bassett, at the George, near Clifford's-Inne, in Fleet-street. 1677.

Being convinced "that there hath been and is a great abuse to the people of this kingdome, in the Silver and Gold that is wrought into the several sorts of wares in use amongst us," the author "has framed this Discourse" for the prevention of such frauds. To this end he shows what are the proper properties of "Alloy" in standard gold and silver; what are the "Statutes and other Lawes in force for preventing the working and selling Gold and Silver that is worse than that Standard;" and generally what are the best means for detecting and obtaining redress for fraud. The book further contains the charter of the "Goldsmith's Incorporation," and a good deal of information connected with that company. The frontispiece is divided into two parts, of which the upper represents a goldsmith's shop, the most prominent object being a colossal figure of St. Dunstan, the patron of the craft; the lower represents a workshop, and the various tools, implements, and processes in use. F. T. M.

Godfrey Ambrose.—Manuscript Book of Formulæ.

This is exhibited simply as being curious, nearly every recipe having become obsolete; still it fairly represents the Pharmacy of that date. About 1690.

Thomæ Sydenham, M.D.—Opera Universa.—In quibus non solummodò Morborum Acutorum Historiæ et Curationes nova et exquisitâ methodo diligentissimè traduntur, verùm etiam Morborum fere omnium Chronicorum Curatio brevissima, pariter ac fidelissima in Publici commodum exhibetur. 1705.

This celebrated work needs little or no description, but it is exhibited as being one of the books which founded modern medicine and pharmacy.

Sydenham was born in 1634, with the misfortune of hereditary wealth. Dr. Cox, the family physician, attended his brother, and engaged Thomas, who had no occupation save genteel idleness, to enter on the career of physic. His history is remarkable as being one of uninterrupted success. An Oxford scholar, fellow of All Souls, and a gentleman at ease, he gave himself up to study. His

manual, here presented, is one of the classics of the profession. To describe it would be foolish; to omit it from this collection would be wrong. Sydenham died at Pall Mall, December 29, 1689; and St. James's, Westminster, received all that was mortal of one of the greatest physicians of his age or of any other. J. I.

Pomet.—Histoire Générale des Drogues, traitant des Plantes, des Animaux, et des Minéraux. Ouvrage enrichy de plus de quatre cent Figures en Taille-douce tirées d'après nature; avec un Discours qui explique leurs différens Noms, les Pays d'où elles viennent, la manière de connoître les veritables d'avec les falsifiées, et leurs propriétez, où l'on découvre l'erreur des Anciens et des Modernes; le tout très utile au public. Par le Sieur Pierre Pomet, Marchand Epicier et Droguiste. Paris, 1694. Fol.

No work of its class has enjoyed a more deserved and extensive reputation than Pomet's History of Drugs.

Here is the first edition published in Paris in 1694, at which period Pomet was keeping a shop in the Rue des Lombards, the great drug shop of that capital, as his advertisement at the end of the volume makes manifest. But what a marvellous contrast is a *History of Drugs* in the seventeenth century to the *Manual of Materia Medica* which suffices for the nineteenth! Would any modern student have the courage to sit down to the perusal of the stately folio of 528 pages, illustrated by 400 engravings? To speak seriously, Pomet's book is of great utility and excellence, not so much by reason of its erudition and research, as on account of the information which the author gives as the result of his own observation and experience. Although it is profusely illustrated by engravings which must have been produced at no small cost, the figures are often poor and spiritless, and in some instances entirely imaginary, thus contrasting unfavourably with the rude but life-like woodcuts of Brunfel's, published a century and a half before.

D. H.

Monardes (Nicolaus). Historia de las Cosas que se traen de nuestras Indias Occidentales que sirven en Medicina. Sevilla, 1574. 4to.

The writer who first gave to Europe an account of the more useful plants and vegetable products discovered by the Spanish adventurers in the New World, was Dr. Monardes, a physician of Seville, who, in 1569, published a small volume under the above title. Other editions of this work were printed in 1571, 1574, and 1580. In

1596 an English version, made by one Frampton, was published as "Joyfull Newes out of the New-found Worlde." The work also appeared in French, the translator being Antoine Colin, Maistre Apoticaire juré de la ville de Lyon, and in Italian. Better known than the original Spanish, or than the English, French, or Italian translations, is the excellent Latin version included in the "Libri Exoticorum" of the learned Clusius, which appeared in 1605. Monardes never visited America, but derived his information and specimens from the navigators and explorers, who were, doubtless, at that period frequently arriving at Seville. Among the drugs he describes are Copal, Anime, Liquidambar, Balsam, Guaiacum, Sarsaparilla, Tobacco (of which there is a woodcut), Sassafras, Coca Leaves, and Cevadilla, besides many which now find no application in Europe. Of this latter class is *Nephritic Wood*—a substance, the origin of which is still entirely unknown. It is remarkable for its aqueous infusion, exhibiting a beautiful blue layer on the surface (like a solution of quinine), a fact which Monardes did not fail to observe. D. H.

Hieronymus Brunschwyg on the Art of Distillation.

A work of which there are numberless editions, including an English version printed in Southwark in 1525, and entitled "Noble Experience of the Virtuous Handywork of Surgery . . . and of Distillation." The present edition appeared at Strasburg in 1515; appended to it is the "Book of Life of Marsilius Ficinis, the Florentine," which contains some curious representations of mediæval herb gardens, an apothecary's shop, laboratory, studio, besides various scenes of domestic life. The volume has been much mutilated; but it is of interest as having belonged to Philip Melancthon, in whose hand it is probable are some of the manuscript notes on the fly-leaves at the end. D. H.

Prosperi Alpini de Plantis Ægypti Liber. Venetiis, 1592. 4to.

Prosper Alpinus, a celebrated physician, and professor at Padua, visited Egypt between the years 1580 and 1584, publishing on his return several works bearing upon medicine. One of these is a small volume on the plants of Egypt, in which the author describes and figures various useful trees, shrubs, and herbs, at that day but little known. Among the number are Cassia Fistula, the Sycomore Fig, Date Palm, Tamarind, Cotton, and Sesamum. The first edition

of this book appeared in 1591; the second published at Venice in 1592, is that herewith.

An account of this work will be found in *Pharmaceutical Journal*, vol. ii., p. 367. D. H.

The late Dr. Pereira's Note-book on Cardamoms.

Interesting as showing with what labour and patience the author sought for and noted information relative to any particular subject on which he was at work.

Christiani Francisci Paullini Μοσχοκαρυογραφια *seu Nucis Moschatæ Curiosa Descriptio, historico-medico-physica. Francofurtii et Lipsiæ*, 1704. 8vo.

A curiosity of prolixity, the whole work of 876 pages being devoted to a discussion on *nutmegs*.

Herbarius Pataviæ. Printed at Padua in 1485.

It consists of an alphabetical catalogue of medicinal plants, a rude representation of which heads each chapter. The name of each plant is given in German as well as in Latin.

Otho Brunfels,—Herbarum Vivæ Eicones ad naturæ imitationem, summâ cum diligentiâ et artificio effigiatæ. Argentorati, 1530. Fol.

Brunfels, a native of Mentz, was a theologian and physician, occupying in the latter capacity the post of *poliater*, or chief medical officer, of the city of Bern. In this office he died A.D. 1534. Of his numerous works, that of which the title is here given is remarkable for its excellent woodcuts, which have indubitably, as the author asserts, been made from the very plants, and not drawn from memory or imagination. In this respect they present a most striking contrast to the figures in other works of the period, as well as in many of those of a much later date. D. H.

Thermæ Bathonicæ sive earum descriptio, Vires, utendi tempus, modus, etc., Scripta à Thomâ Johnsono. Scribere jupit Amor. Londini, 1634.

This is very rare and curious. Two hundred and thirty-six years

have elapsed since it was published; and before noticing it more particulary, we give the titles of the works published by the same author, as follows:—Opuscula Omnia Botanica Thomæ Johnsoni, Pharm: Soc: Londinensis.

1. Iter Botanicum Cantianum. 1629.
2. Iter Botanicum Hampstedianum. 1632.
3. Mercurius Botanicus. 1634.
4. Thermæ Bathonicæ. 1634.
5. Mercurii Botanici paisaltera. 1641.

Observe,—he was one of a Pharmaceutical Society of London; this is the first indication of any such society. Now for the Thermæ Bathonicæ:—next to the title-page we find an ancient and curious print or plan of the city, wherein are pointed out not only the baths but the churches, etc. To be appreciated it must be seen.

The introduction is addressed to his wandering companions of the Most Noble Pharmaceutical Society of London. Thus:—"Sociis suis itinerantibus Clariss. Societatis Pharmaceut. Lond. Amicis, multis nominibus chariss. Salutem, Auctioremque; fælicitatem optat Thom: Johnson.

The whole of this treatise is written in Latin, giving an account of the city as well as the baths of *Bathe*. The baths are thus named,—the King's Bath, the Queen's Bath, the Bath of the Cross, the Hot Bath, and the Bath for the Leprous. Descriptive engravings are given of these, the King and Queen's being one engraving, the Hot and for the Leprous another, and the Cross by itself. The engravings are necessarily small, and curious from their antiquity.

A. F. H.

A Brief Account of the Holt Waters: Containing one hundred and twelve Eminent Cures performed by the Use of the Famous Mineral Waters, at Holt, near Bath, in Wiltshire. Being faithfully collected by Henry Eyre, Sworn Purveyor to Her Majesty for all Mineral Waters. To which are added Directions for drinking the Holt Waters, and some experimental Observations on the several Wells. London: Printed for J. Roberts, at the Oxford Arms, in Warwick Lane. 1731. (*Pr.* 1*s.*)

Facing the title page may be seen a drawing of the frontage of the Three Pumps, bearing the inscription, "Veritas in Puteo." The aim and nature of this treatise will be best gathered from the index, as thus:—

"*An Index of Diseases pointed to in the List of Cures.*—Bones Carious, Cancers, Cholick, Dropsy, Eyes Inflamed, King's Evil, Fistula in Ano, Gleets Old, Itch, Injuries from Mercury, Leprosy, Piles, Redness in the Face, Scurvy, Settlement of Fevers, Scald Heads, Old Sores, Surfeits in the Blood, Venereal Relicts, Sharp Violent Humours." There are several errata which the reader is desired and instructed to amend.

The first discovery of these waters at *Holt* and their action was merely accidental, in the following manner. About 40 years ago, say 1690, one of the inhabitants of Holt sinking a well near his house opened a spring about 11 feet deep, which plentifully supplied him with water; and soon after, expecting a visit from some of his relations, he brewed a barrel of ale with the water of this new well, to entertain his friends with; and for their better reception, a joint of mutton was got ready, and boiled in the same water; but when the meat came to be set on the table, it appeared so discoloured and of such a sooty hue that he was almost ashamed to set it before his guests. However they sat down to their repast, and hunger being their sauce, they eat plentifully and drank freely, but in a little time the mineral water began to exert its operation, and they all found themselves sick of the same disease: every one complained of a flux for a considerable time. The story becoming known, the water was examined by Dr. Guidot, of Bath, who made trials upon it, and found out its true nature. One or two extracts from the collection of cures, will be sufficient to show in some degree the characteristic qualities of the water.

"1st. Hannah Whitehead, late of Mangotsfield, near Bristol, now living at Holt, and about 14 years of age, had been afflicted with the King's Evil in one of her feet for several years; the bone was foul and carious, and after the trial of other methods without success, was at length sent to Holt, for the benefit of the Waters; by drinking of which and washing the affected part therewith, in some time three or four splints of the bone worked off, and at last she was perfectly cured. Hereof I certify the truth, this 19th day of January 17[illegible] HANNAH WHITEHEAD.

"2nd. A certain gentleman, who desires his name may *be concealed*, had for two years a stubborn gleet which nothing could stop, till he was advised to drink the Holt Waters, from which he found immediate benefit, and was perfectly cured in five weeks. This was effected by the water from the New Well."

Now the curtain falls upon the Well Waters of Holt.

A. F. H.

Johannis Subtermontani Thermologia Bristoliensis; or, Underhill's Short Account of the Bristol Hot-Well-Water, its Uses and Historical Cures. Ille pater rerum, qui Secula dividit Astris Inter prima Poli Te quoque sacra dedit. Et fragilem nostri miseratus Corporis Usum, Telluri Medicus fundere jussit Aquas.—Claudian de Aquis Aponen. Bristol. Printed and Sold by W. Bonny. 1703.

This is one of a collection of treatises upon mineral waters. Note the peculiarity of Latinizing his own name, Johannes Subtermontanus, *alias* John Underhill, also the phraseology. It may be well perhaps, as it is not long, to give in full the Epistle Dedicatory.

"To the Right Worshipful Sir William Lewis, Knight, the present Mayor, and to the Worshipful the Aldermen and Common Council of the well governed City of Bristol, all Health and Happiness.

"Finding no satisfactory Publick Account of your most useful Hot-Well-Water, imboldens this Address in behalf of the well-meant following Specimen, (the meaner the Performance the greater generosity is showed in your favourable Protection). The Abbreviation was design'd for a private Hand, but, Providence having cast me under your Care and Umbrage, I wholly submit it to your Censure and Promulgation, hoping you will please to cherish it amongst the Impotent under your tender Charge.

"As the Water is Nature's Free Gift, at all Men's Command, it seems reasonable that the Use of it should be published within the Reach of every little Purse, which made me to contract the Print; but if this new-fledg'd Eagle can by your Favour indure the Sun (now in its Vigour) I shall hereafter strain one of the same Brood some stronger and sharper Flights.

"Not further to obstruct the Publick in so Commendable, Exemplary, and most useful City-Government,

"Your Worships' most dutiful humble Servant,

"JOHN UNDERHILL."

"College Green, Bristol, the 26*th* of *August*, 1703."

John appears to have no small opinion of his production when he likens it to an eagle. The account of the situation of the Hot Well, about a mile to the west of Bristol Cathedral, its composition and great value as a remedy, occupy but a few pages, whilst three times the space is devoted to cases.* Johannes has a touch of poetry in his veins, and thus in speaking of the spring, he says: "*Nature*

* Full particulars in Chilcott's History of Bristol.

hugs this *Darling* nymph." As a sample of cures effected, we take the following. "Mr. Tyndale, of Wind Street, Bristol, had a child of his at a year and half old, by twice bathing with the Hot-Well Water perfectly cured of an universal breaking out, and clear'd all his other children of the Itch at once bathing with it; and at another time by bathing with it, cured another of his children of an inflammation all over his body (which they call'd St. Anthony's Fire), when as red as scarlet, and swell'd like a brac'd drum all over. ONES. TYNDALE."

And now for the concluding remarks: "This Synopsis admits not accompting for the numerous and great cures effecting by the Hot-Well Water, but if this Draught in Little, relish the *Hydropotists*, I'll publish (*Deo dante*) the *Paralipomena* or *Relicta* which are *Cedro digna*, and at present take leave with another touch of the Lyrick Poet,—

> "Si tibi nulla sitim finiret copia Lymphæ,
> Narrares Medicis.—*Hor.*, lib. ii., epist. 2."

A. F. H.

Dr. Radcliffe's Practical Dispensatory, containing a complete Body of Prescriptions Fitted for all Diseases Internal and External, Digested under proper Heads, selected (1) *From various Authors.* (2) *From the best Prescriptions chiefly used by Dr. Radcliffe, regularly placed under each Corollary.* (3) *An Exact Catalogue of all the Prescriptions recited in the London, Bate's, and Fuller's Dispensatories; with Remarks and Observations explaining the Virtues and Right Application of each Recipe: and a large Index to the Whole. By Edward Strother, M.D. The fourth Edition. London: Printed for C. Rivington, at the Bible and Crown, in St. Paul's Church Yard.* 1721.

A portrait of the doctor, wearing a long, flowing, curling wig, after the fashion of the period, adorns the frontispiece, under which is written, "Johannes Radcliffe, M.D. Ob. Nov. 1, 1714. Ætat. 64. Printed for Charles Rivington, in St. Paul's Church Yard."

Before we examine the contents of the book, let us indulge in a brief account of this once celebrated doctor.

The doctor was born at Wakefield, Yorkshire, in 1650; near which place his father was possessed of a moderate estate, who having a numerous family, did not think it prudent on account of the expense, to breed his children to letters, but at the prompting of

his neighbours was induced at length to send this son to a school at Wakefield. Having shown great aptitude in learning he was removed at fifteen to Oxford, and entered at University College, 1665. In 1669, he took his first degree, and was chosen Senior Scholar of this college. In June, 1672, he took his degree of M.A., and in 1675, Bachelor of Physic. After this he practised in Oxford until 1684, when he came and settled in London.* In the autumn of 1689, when he resided in Bow Street, Covent Garden, an urgent message reached him rather late in the day. Hurrying into his carriage, he hastened with all speed to Kensington House, then the palace of his Majesty King William the Third. He was ushered into the sick chamber of the king, who had been some time unwell. "Doctor," said the king, "Bentinck (Earl of Portland) and Zuleistein (Earl of Rochford) have been urgent with me that I should again send for you; and though I have great confidence in my two body physicians here, yet I have heard so much of your skill, that I desire you will confer with Bidloo and Laurence [the medical attendants], whether some other plan might not be adopted." "May it please your Majesty," said Dr. Radcliffe, "I must be plain with you, sir. Your case is one of danger, no doubt, but if you will adhere to my prescriptions I will engage to do you good." The consultation between the professionals was short, the treatment altered, and the royal patient was soon restored, and a few months afterwards he fought the battle of the Boyne.

The doctor was a great frequenter of taverns and clubs, where the choicest spirits of the day were wont to assemble. He was at one time engaged to be married to the daughter of a wealthy citizen, but a discovery which he seemingly made during his courtship, and which did not redound to the lady's credit, caused him to break the engagement, although a source of regret at the time; but in his plain peculiar way he infers that the lady, however a very deserving gentlewoman, is not fit to be his wife, as she is, or ought to be, another man's already.

His practice was very large, and increased daily. He had considerable humour, and once when sent for to a gentleman suffering from quinsey, for which no application had been of service, he desired the lady of the house to have a hasty pudding prepared, and when done his own servants brought it up. It was placed on the table in full view of the patient. "Come, Jack and Dick," said Radcliffe, "eat as quickly as possible; you have had no breakfast this

* From the *Universal Magazine* for July, 1760.

morning." Previously instructed, they commenced a fierce attack upon the pudding; but one dipping faster than the other, a quarrel arose, ending in the pudding being pelted at each other. The patient was seized with a hearty fit of laughter, the quinsey burst, discharged its contents, and the cure was thus speedily effected. He always spoke confidently, and thus inspired hope and faith in his patients. When in his sixtieth year he was once more in love with a very young lady, but was unfortunate and rejected, and so remained single for the rest of his life. Speaking of himself in the latter part of his days, he says, "By following the dictates of common sense, while I practised at Oxford, after taking my degree of Bachelor of Medicine, instead of stoving up my patients who were ill of the small-pox, I gave them air and cooling emulsions, and thus rescued more than a hundred from the grave." He always discountenanced quacks and intermeddlers, as he styled them.

He realised by his practice a princely fortune, and is now more particularly remembered by the way in which, looking upon Oxford, his Alma Mater, he bequeathed his property. He left his Yorkshire estate to the Master and Fellows of the University College for ever, in trust for the foundation of two travelling fellowships; £5000 for the enlargement of the building of the University College; £40,000 for building a library at Oxford; £500 yearly for ever towards mending the diet of St. Bartholomew's Hospital.

We may now, with some faint idea of the character of the man before us, turn over the pages of the doctor's Dispensatory, fourth edition, published seven years after his death, which will at once explain why there is no introduction from Dr. Radcliffe.

The Pharmacopœia Practica is divided into two parts and an appendix. In the first part, twelve chapters treat of Cathartics, Glysters, Suppositories, Diaphoretics, Leeching, Tapping, etc., etc. In the second part, six chapters treating of Restoratives, Attenuants, Neutrals, etc., etc. The appendix treats of Opiates, Milk, Dipping, axioms concerning local medicines, etc., etc. Also an index to the first and second parts, referring to every remedy or disease mentioned in the work.

To give an example or two of the style of the author and his treatment of disease, we quote the following touching on Cholera.

"When Persons are inclinable to a Vomiting, Promotion is often necessary; and therefore in a *Cholera Morbus*, where there is an abundance of bilious and sharp Humours, there you may gently promote it by giving Chicken Broath or Whey or Barley-water; after you have diluted and washed well, give 'em *Decoct. Alb.* and at-

temperating Draughts with *Laudanum* in 'em till the Vomiting ceases. I speak upon a supposal that you are called early in; because if the Vomiting has continued so long as to have exhausted the spirits, nothing remains to be done save the giving of Opiates and Cordials." The learned in treatment may decide how far this differs from modern usage.

The following for an enema may in some degree surprise dispensers accustomed to the extreme simplicity, simple sometimes to a fault, of modern prescribers.

"Take the decoction of Aromaticks, viz., Calamus Aromaticus, Galangal, of each half an ounce; Leaves of Mint, Wormwood, Centaury Tops, of each two Pugils [handfuls]; Seeds of Caraways, Anise Seeds, and Cardamoms, of each half an ounce; mix with it Electuary Lenitive, and *Epsom* Salt, of each one ounce; Oil of Amber, half a dram; mix and make a Glyster, to be thrown in."

There are numerous eccentric forms similar to the above, and many others simple as those in general use at the present time. Some of the means prescribed would scarcely admit of being printed now, therefore we pass them over. Many of the observations are full of sound reasoning, and, deprived of peculiarities, might stand side by side with the writings of modern authors; and with this we close our remarks on Dr. Radcliffe's Pharmacopœia Practica.

A. F. H.

Caroli Linnæi, Equitis De Stella Polari, Archiatri Regii, Med. et Botan. Profess. Upsal. Acad. Upsal. Holmens. Petropol. Berol.; Imper. Lond. Monspel. Tolos. Florent. Soc. Systema Naturæ per Regna tria Naturæ secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis, Locis. Tomus I. & II. Editio Decima, Reformata. Cum Privilegio S: æ. R: æ. M: tis Sueciæ. Holmiæ: Impensis Direct. Laurentii Salvii. 1758.

The first volume is given to the Animal Kingdom.

We are struck upon opening these volumes with the very appropriate and just quotations.

"O Jehova!

"Quam magnifica sunt Tua Opera Vir insipiens non cognoscit ea et stultus non animadvertit ea."—*David.*

Again, at the end—

"Pauca hæc vidimus operum Dei,
Multa abscondita sunt majora his."—*Syrac.* xliii. 3.

The entire work is in Latin.

The first volume, Animal Kingdom, commences with Mammalia, and finishes with Zoophyta. "In the works of the older Botanists, Zoophytes, whether hard and stony, or flexible and horny, were arranged and described with Seaweeds and Mosses, without any misgivings as to the propriety of doing so; but now for more than a century their animal structure has been almost universally admitted." —CARPENTER.

To those more especially interested, the following may afford some idea of the mode of describing.

"29. Moschus.

Cornua nulla.

Dentes laniarii superiores solitarii exserti.

Moschiferus.

1. Moschus. Syst. nat., 13.
Animal Moschiferum. Raj. quadr., 127.
Capreolus Moschi. Gefn. quadr., 695.
Capra Moschus. Aldr. bifulc., 743. Jonst. quad., 55, t. xxxix.
Moschus. Schrôck. monogr., t. xliv.

Habitat in Tatariâ versus Chinam. Moschus substantia unctuosa ambrosiaca è folliculo propè umbilicum.—*Schrôcki Historia Moschi. Wiem.* 1682. *Quarto.*"

The second volume comprises the Vegetable Kingdom.

"Flos est Plantarum Gaudium tum se novas aliasque quam sunt ostendunt, tum variis colorum picturis in certamen usque luxuriant." —PLIN. xvi. 25.

We have only space to draw attention to the work itself; but having mentioned the flower, we will transcribe the description given of it.

"Flos. Planta interior nuda, exuta Larva Herbæ mera metamorphosi, instar insecti alligati volitantis, coleoptrato. Calyce, alatibus Corollis, constat folis viscerum genitalibus Staminibus et Pistillis, quorum germina adolescant in fœcundum ovarii Pericarpium gravidum ovis seminum." A. F. H.

The Treasury of Drugs Unlock'd, or a full and true Description of all sorts of Drugs and Chymical Preparations, sold by Druggists. Whereby you may know the Place of their Growth, and from whence they come, and how to distinguish the Good from the Bad.

Very useful for all Gentlemen, Merchants, Druggists, Doctors, Apothecaries, Chirurgeons, and their Apprentices. As also for all Travellers, Seamen, Custom-house Officers, and all others that either traffick in them, or make any use of them at the Waterside. Giving a true account of all those that are Prohibited, and those that are not, whereby many Disputes and Law Suits may be prevented. The whole work alphabetically digested, with a Catalogue of all Drugs, etc. By Jo. Jacob Berlu, of London, Merchant in Drugs. The Second Edition, with Additions. London: Printed for S. Clarke, the corner of Exchange Alley, next Birchen Lane. 1724.

"The Treasury of Drugs Unlock'd," compared with the works of modern authors, is an imperfect attempt at Materia Medica. An address to the reader is very characteristic of the writer. In modern style, it would run somewhat thus:—

"Courteous and benevolent reader,—Nothing can more effectually promote the interests of trade, than a perfect knowledge of and acquaintance with the articles intended to be dealt in. A fact which encourages me in the hope that this treatise will be well received by druggists, who are, as a class, too generous to entertain so narrow-minded an opinion as that Romish one which urges that it is good to keep the people in ignorance.

"The price current of drugs, published weekly, may act prejudicially: this treatise cannot; for the more the quality of an article is understood, the greater or otherwise, according to its quality, will be its value."

Certain articles being prohibited, the writer places an asterisk against such, so that the dangers thereof may be avoided, by which he apparently suffered in his property, although he does not state how this came about.

We will now take an example or two from the collection.

"* Aloe Succotrina, is the finest of Aloes, therefore by some called *Aloe Lucida*. 'Tis made in an island called Succatora (*Socotra*), near Moco (*Mocha*), in the East Indies. The finest is most transparent; if broken, it turns to a fine yellowish powder. 'Tis brought to us from the Indies. The smallest, thinnest, and lightest bladders are to be preferred."

N.B.—Mocha is in Arabia, not in the East Indies, though then, as now, most of these aloes reach England *viâ* Bombay.

The following may be interesting to some of our young Pharmaceutists as a danger signal—of vagueness:—

"Resina Jalapii. Rosin of Jallop is of a Chymical Preparation, the same being drawn from a good black rosiny Jallop. Its goodness is known by being clear, transparent in a manner." [Note the orthography of Jalap.]

"Rosin of Scammony is drawn in a similar Chymical way."

The description of English liquorice will astonish those who now pride themselves upon their extract.

"Succus Liquiritiæ Angl.

"English Juice of Liquorice is made in round Balls, and sealed. It is generally made up with old Prunes, Liquorice, and such other Trumperies, and therefore far inferior to the Spanish Juice."

The Treasury closes with a catalogue of all the articles.

Courteous as the reader may be, he will probably be thankful that his lot was not cast in the days of "The Treasury of Drugs Unlock'd."

A. F. H.

The Dispensatory of the Royal College of Physicians, London, translated into English with Remarks, etc., by H. Pemberton, M.D., Professor of Physic in Gresham College, and F.R.S. London: Printed for T. Longman and T. Shewell, at the Ship, in Paternoster Row; and J. Nourse, at the Lamb, over against Katherine Street in the Strand. MDCCXLVI. 1746.

We are reminded by the title-page of this work that the desirability, if not the necessity, of a translation of the Dispensatory of the College of Physicians is of somewhat ancient origin; and the addition of remarks by the translator to render the work more valuable and saleable is not an idea of modern times; and though the fashion of indicating a particular establishment by a sign, to wit, the *Ship* in Paternoster Row, and the *Lamb* over against Katherine Street, is now obsolete, always perhaps excepting roadside inns, taverns, and tobacconists, our ancestors would not be less than astonished at the extraordinary trademarks of the present day attached to proprietary articles, otherwise known as specialities.

A short advertisement of the translator is followed by a Table of Contents, the Preface of the College, and a narrative of the proceedings of the Committee appointed by the College of Physicians to review their Pharmacopœia.

This narrative occupies 126 pages, out of 419 of the work. In connection with observations made in our own day upon the value

of pure sugar in the preparation of the syrup of iodide of iron, the following remarks of the committee, rather more than a century ago, may not be out of place. "The Committee have recommended the *finest* Sugar in all Syrups." Then follow various operations for cleansing and purifying sugar, and then "whoever duly considers these operations, must see that unfine sugar is little more to be preferred to that which is thoroughly purified, than wine half fermented is to that which is compleated."

In the Weights and Measures, the pound contains twelve and the fluid pint sixteen ounces. In the Materia Medica, occupying only 14 pages, the descriptions are meagre in the extreme: *e.g.*, "Benjamin, Benzoin. Lesser Cardamom, Cardamomum Minus, the seed," and so on. But this deficiency is made up for by a large number of remedies now discarded, as thus:—Brooklime, Centaury, Cowslips, Crab's Eyes, White Dead Nettles, etc. Amongst those which are called Simple Preparations, we find, "the purification of Viper's Fat, burning of Sponge, Thebaic Extract and the Preparation of Millepedes."

Then follow the usual conserves, preserves, juices, mixtures, pills, spirits, resins, waters, ointments, epithems, tinctures, and syrups; then there is an index of preparations, whose names, though their virtues are not altered, it has been thought expedient to change. Of these there are seventy-three. For instance:—Calomelas, old, Mercurius dulcis sexies sublimatis, new name. Pilulæ eduobus, altered to Pilulæ ex colocynthide simpliciores. "What's in a name?" Posterity may perhaps decide definitely; as yet we are still open to change.

Lastly, we find an English and a Latin index, also a table for computing the doses of compound purgatives, opiates, and mercurials.

H. Pemberton, Physician and Mathematician. Born, 1694. Died, 1771. A. F. H.

A Treatise of the Nature and Use of the Bitter Purging Salt, easily known from all Counterfeits by its Bitter Taste. Written originally in Latin, by Nehemiah Grew, Dr. in Physick, Fellow of the College of Physicians, and of the Royal Society, and now published in English, by Joseph Bridges, Dr. in Physick. With animadversions on a late corrupt Translation published by Francis Moult, Chymist. London: Printed by John Darby, for Walter Kettilby, at the Bishop's Head, in St. Paul's Church-Yard. 1697.

This is probably the first authentic account of the Epsom or Ebesham bitter Purging Waters. The preface is long, and occupies considerable space in setting forth the faults of the said chemist, who published a corrupt translation. The said translator is accused of exposing the lives of people both by misinterpreting of some medicines and rules prescribed by the author, and omitting of those cautions which ought to have been given to the English reader.

The approbations which were prefixed to the author's original were, by the late translator, also suppressed. The book is divided into two parts; the first relating to the Nature of the Bitter Purging Salt, the second treating of the Use of the Bitter Purging Salt. We may pass over the first part, and mention more particularly some of the complaints in which the water may be used with advantage. In Diseases of the Stomach. To quicken a decayed Appetite. To stay Vomitings. In the Pain of the Stomach, like the Colick, etc., etc., etc. In truth, almost a cure for all the complaints flesh is heir to. Then follows a chapter upon the Misuse of the Bitter Waters; and last of all a table showing some of the more egregious falsifications made in the translation lately published by Francis Moult, Chymist. A multitude of lesser faults being here omitted, we will not enter into the particulars of said faults, but hope that such may not be imputed to any of our brethren of the pestle and mortar. A. F. H.

The New Dispensatory, containing—I. The Theory and Practice of Pharmacy.—II. A Distribution of Medicinal Simples, according to their Virtues and sensible Qualities, the Description, Use, and Dose of each Article.—III. A full translation of the London and Edinburgh Pharmacopœias, with the Use, Dose, etc., of the several Medicines.—IV. Directions for Extemporaneous Prescriptions, with a select Number of Elegant Forms.—V. A Collection of Cheap Remedies for the Use of the Poor. The whole interspersed with Practical Cautions and Observations, intended as a Correction and Improvement of Quincy. London: Printed for J. Nourse, opposite Catharine Street, in the Strand. MDCCLIII.

Time does not allow us to look through this as we could desire. The chapter on Juices might, with some modification or improvement, be turned to account. The action of the air after defecation, is prevented by a stratum of oil upon the surface of the juice. Cooks in the present day adopt a similar plan in preserving fruit,

having first by means of heat driven the air from the bottles before adding the oil.

A peculiar feature in this work, and worthy of notice, is that part designated Pharmacopœia Pauperum. The doses, however, remind us of Morrison or Holloway. Take the following :—

"Pilulæ Roborantes, Edinb. Strengthening Pills.

"Take of Olibanum, one ounce and a half; Styptic Powder, one ounce; Salt of Steel, half an ounce; Syrup of Sugar, 9s. Mix and make them into a mass.

"This composition is a very effectual strengthener and astringent in the Fluor Albus and other like complaints. Half a drachm of the mass, formed into *five or six pills*, to be taken twice a day."

There is a table of Diseases and the Remedies, and a very full Index.

A propos of the sea-side season, we note the following :—

"Freckles: Magistery of bismuth, magistery of tin, virgin's milk, litharge vinegar, acrid juice of anacardium." A. F. H.

Hippocrates Contractus in quo Magni Hippocratis Medicorum Principis Opera Omnia in brevem Epitomen Summâ diligentiâ redacta habentur Studio et Opera. Thomæ Burnet, M.D. Medici Regii et Collegii Regii Medicorum Edinburgensis Socii. Editio altera longé emendatior Londini. Prostant venales apud Car. Davis exadversus Hospitium Grayense, Holbourn; et Joannem Whiston, in Fleet Street. MDCCXLII.

A condensed or abridged edition in Latin, of the works of Hippocrates, the celebrated Greek physician, who flourished in the time of Artaxerxes, was born in the island of Cos, and lived according to some to be 90 years of age, to others 104 and 109.

The first page is occupied by an approbation or certificate of merit in favour of the Hippocrates Contractus, and signed by the president and two censors of the College of Physicians in Edinburgh. A dedication to the most illustrious and noble Lord James Earl of Perth, etc., faces the same; and the aforesaid physicians also enjoy the honour of the dedication. Then follows a Preface to the Reader.

The work is divided into eight sections, treating of the various subjects connected with the profession of the physician, the nature and treatment of diseases; not omitting a chapter upon the oath

and the law of Hippocrates; concerning the Art or Science; Ancient Medicine; the Physician; becoming demeanour, and instructions or precepts. A copious Index of all the subjects bringing up the rear. A. F. H.

Pharmacopœia Extemporanea; or, a Body of Medicines, containing a thousand select Prescripts, answering most intentions of Cure. To which are added useful Scholiæ, a Catalogue of Remedies and copious Index, for the assistance of young Physicians. The Second Edition, with large Additions by the Author, Thomas Fuller, M.D., Cantab. Mille mali species? Mille salutis erunt. London: Printed for William Innys, at the Prince's Arms, in St. Paul's Church Yard. 1714.

This work dates but one year after the fourth edition of Bate's Dispensatory, by Salmon, and can scarcely be said to be in advance of that work, if we judge by the formulæ which to modern physicians and pharmaceutists appear, if not extraordinary, very unusual. There is an address or explanation to the physicians. The author objects to the ordinary fulsome manner of dedicators, whether towards the living or the dead, mentioning Wedelius, who dedicated his Physiologia to his dead wife.

The phraseology is necessarily that of the period. The author endured much from the fear that his work might suffer from being translated in Holland (his first being in Latin); and after explaining how much trouble he had taken in endeavouring to make it good, he adds:—

"But such is the unfairness of people, that four several translations of it were abroad in order to be printed without my consent, or so much as knowledge. And at length when there came out an advertisement in the *Post Man*, Sept. 18, 1708, that it was going to the press, in the company of several other, Pharmacopœias, on Michaelmas-day next, I was afraid of being ill-used, and so was forced to translate it myself." There was an objection amongst many to English versions of Pharmacopœias, and so the reason for his explanation.

The Preface to the Reader contains much about the dignity of the profession, and the duty of the physician; also very strong language against unlawful practitioners; take the following:—"And yet every illiterate Fellow and paltry Gossip that can make a shift to patch up a Parcel of pitiful Receipts, has the Impudence and Villany to

venture at it: And in hopes of a Pig, Goose, or Basket of Chicken, shall boldly stake their skill (forsooth) against Men's Lives, and lose them: and at the same time scandalize and keep out true Physicians that might probably save them." There is much still that might be extracted, but time and space warn us to afford a sample of two of the preparations.

There are about thirty forms of ale for different complaints. We give the following short one:—

"Berry Ale. Take of Berries of Wild Briar (dried and bruised) half a Pound: of Juniper 4 ounces; of Holly and Ivy, Seeds also of Dancus and Sweet Fennel, each 1 ounce; Herbs of Marshmallows, Pellitory of the Wall, Cleavers, Golden Rod, each 4 Handfuls; Raisins half a Pound; dispense these for 4 Gallons (of Ale). It breaks off Wind, and cleanseth the Kidneys and Bladders from Slime and Gravel."

We are reminded of a remark sometimes made even now,—Well, if one thing does not hit the mark another may. The preparations would afford much opportunity for discussion. The following remedy for a rupture would amuse our surgeons:—

"Take Conserve of Hypericon-flowers, 1 ounce; Pulp of Comfrey Root (baked in an oven, with sugar Laying upon Laying) half an ounce; the Stone called Hæmatites (reduced with Spirit of Wine on a Marble to an Alcohol) 2 drams; Dragon's blood in drops, 1 dram; Sugar of Saturn, Balsam of Peru, of each half a dram; Oil of Anniseed, of Sweet Fennel Seed, of each 2 drops: Syrup of Coral, 1 ounce, or as much as there is occasion for to make it up with; mix. The Dose is 2 or 3 Drams."

With this, we say to Dr. Fuller, Vale! A. F. H.

Pharmacopœia Officinalis and Extemporanea; or a Compleat English Dispensatory in four parts, containing—I. The Theory of Pharmacy and the several Processes therein.—II. A description of the Officinal Simples with their Virtues and Preparations, Galenical and Chymical.—III. The Officinal Compositions, being such of the London and Bate's Dispensatory as are now in use; together with some others of uncommon efficacy, taken from the most celebrated Authors.—IV. Extemporaneous Prescriptions, distributed into Classes suitable to their intentions in Cure. By John Quincy, M.D. The third Edition, with large additions. London: Printed for

A. Bell, at the Cross-Keys and Bible, in Cornhill, W. Taylor, at the Ship, in Paternoster Row, and J. Osborn, at the Oxford Arms, in Lombard-street. MDCCXX.

A dedication appears almost a necessity with ancient authors; and to say that they laid on the soap occasionally rather thick, is not going beyond the truth; read an extract of a small portion of Dr. Quincy to his friend Joseph Collett, Esq.

"But the advantages of a well-regulated conduct you have happily experienced in affairs of much greater concern: and it is with joys inexpressible that Relations, Friends, and Acquaintances, see in your Life the returns of Virtue even in this world; and that an affluence of Wealth and Honours are the reward of a firm Integrity."

In the Preface to the Reader we are struck with the following, when writing of wholesale Apothecaries and Chemists:—

"There may possibly be some of the former who are faithful in their dispensations; but of the latter, it is to be feared none are so; as may be judged by the prices of many things they sell, that are under what the expence of making them genuine comes to, insomuch that a person must be very unconcerned about his patients who can trust them."

But have we not changed all this, and would not the above be a libel upon the present race of Pharmaceutists? This is in reality to a great extent a work of practical Pharmacy, to say nothing of the many and various compound preparations as usually found in Dispensatories of this date. There is a large general Index, also one of Remedies and of Diseases. A. F. H.

The Art of Distillation; or a Treatise of the choicest Spagyrical Preparations, Experiments, and Curiosities, performed by Way of Distillation. Together with the Description of the choicest Furnaces and Vessels used by Ancient and Modern Chymists. And the Anatomy of Gold and Silver; with the chiefest Preparations and Curiosities thereof; together with their Virtues. In Six Books. By John French, Dr. in Physick. To which is added in this third Impression Calcination and Sublimation, in two Books. As also the London Distiller, exactly and truly shewing the way (in words at length, and not in mysterious characters and figures) to draw all sorts of Spirits and Strong Waters; together with their Virtues,

and other Excellent Waters. London: Printed by E. Cotes, for T. Williams, at the Bible, in Little Britain. 1664.

The first portion of this work contains directions for preparing various aromatic and other waters by distillation. The latter part is truly called a "Miscellany of Spagirical Experiments and Curiosities." In some instances we are bound to conclude either that Dr. French must have been himself the most credulous of men, or that he had unlimited faith in the gullibility of his readers.

You are gravely informed on the authority of that arch-humbug Paracelsus, how to manufacture his *Hommiculas* No. 3, out of corn and wine; how to raise a dead bird to life; how to make a plant grow in two or three hours, so that "thou maist by this means have a sallet grow whilst supper is making ready;" how to extract a white "milkie substance from the raies of the Moon", and many other wonders. The whole is illustrated by numerous very curious cuts.

The term "Spagyrist," is now obsolete; it is not exactly synonymous with "Chemist," as the dictionaries make it. It is derived from σπάω I tear or rend, and ἐγείρω I stir or *build* up; and seems rather to have been more nearly what we now understand by Alchemist. Boyle uses it, but it was probably dropped at the end of the last century. W. A. T.

Speculum Lapidum Camilli Leonardi. Cui accessit Sympathia Septem Metallorum ac Septem Selectorum Lapidum ad Planetas. D. Petri Arlensis de Scudalupis Presbyteri Hierosolimitani. Parisiis. Apud Carolum Seccestre et Davidem Gillium via Jacobœa e regione Mathurinorum et Joannem Petitpas via D. Joa. Lateran in collegio Cameracensi. 1610. *Cum privilegio Regis.* Pp. 499 and index. From page 241 and index in manuscript. [The original work was dedicated at Pisaurum (Pesaro) 1502, to Cæsar Borgia.]

The present volume is embellished with a portrait of Charles de Gonzagues, Duke of Nevers and Rethel, to whom it is dedicated. It is a sign of the times in which this book was written, that amongst the prefatory and dedicatory epistles which fill the first few pages of the work, is inserted a certificate of approbation from the prior of the Carmelites in Paris, testifying that he has seen the book, and that nothing will be found therein which is contrary to the articles of the Catholic faith, and therefore that it is fit for publication. To us the immediate inference from the fact of such approbation would be that it was *not* worth publication. The influence of authority, and particularly the authority of the Church in

that day, was such as to stamp out effectually all struggles to rise by any effort of originality, above the wretched level of the learning of the schools. Without foundation better than that of individual dictum, without aim more definite than the quest of imaginary and impossible miracles, the erudition of these many centuries yielded only barren disputation, but no light.

Camillus Leonardus writes in *his* first book of the properties of stones, their colour, weight, transparency, and so on. He directs that artificial gems may be distinguished from natural by the circumstance that the latter do not melt in the fire. The virtues which are in stones are considered by him to proceed from the stars and the signs of the heavens. The second book gives a list of minerals, with their virtues as remedial agents. The third book treats of the figures and markings in stones, whence they proceed, and the virtues they possess.

It is in fact an exposition of the doctrine of signatures then, and for many years after, commonly believed. Indeed it may not have died out even to the present day; for there are yet people who have faith in *charms*. The virtues of stones (and afterwards of plants) were supposed to be revealed by the figures or markings borne by them; and which either had a resemblance to or were emblematical of objects to be desired or misfortunes to be averted.

It is reported, and Pliny mentions it, that King Pyrrhus had an agate in which were naturally depicted the nine Muses with Apollo striking the lyre. The author adds that he himself has seen one in which seven trees upon a plain appeared. The rest of the book is devoted to an explanation of the *meaning* of the signs visible in stones. One example will suffice:—"The figure of Andromeda is that of a girl with dishevelled hair and drooping hands. The virtue of it, when found engraved in a stone, is that it reconciles disputes and quarrels between man and wife, it strengthens steadfast love and preserves the human body from many infirmities."

The idea, though now rejected by matter-of-fact science, recommends itself forcibly to the poet.

"See on that flowret's velvet breast
How close the busy vagrant lies!
His thin wrought plume, his downy breast,
The ambrosial gold that swells his thighs.

"Perhaps his fragrant load may bind
His limbs;—we'll set the captive free.
I sought the *living bee* to find,
And found the *picture* of a *bee*.

"Helvetia's rocks, Sabrina's waves,
Still many a shining pebble bear,
Where nature's studious hand engraves
The perfect form, and leaves it there."

W. A. T.

Basil Valentine his Triumphant Chariot of Antimony, with Annotations of Theodore Kirkringius, M.D. With the True Book of the Learned Synesius, a Greek Abbot, taken out of the Emperour's Library, concerning the Philosopher's Stone. London: Printed for Dorman Newman at the King's Arms in the Poultry. 1678. 8*vo*, pp. 176, illustrated.

In entering upon the perusal of such a work as this, one is invariably struck by the pious sentiment, or affectation of pious sentiment, with which these early investigators addressed themselves to their work. Basil Valentine was a monk, and therefore it may be supposed that it was in character with his vocation, to make at least a show of invoking Divine aid and blessing. But this characteristic is not limited to his works, the same spirit seems to pervade the writings of many other philosophers who wrote in these comparatively, for science, early times. We go to work in a different way in these days: experiment is no longer the timid interrogation of nature and humble expectation of even the feeblest of her utterances; it is more like a personal assault; it is, as it were, taking her by the throat, and forcing from her, with torture, the dear secrets she so reluctantly yields up.

The preliminaries insisted upon by Basilus as necessary to be observed by him who desires to "obtain a place among true Chymists or fill up the number of perfect Spagyrists," are, first of all, "*Invocation of* God;" secondly, "*Contemplation of Nature.*"

"*Invocation of* God must be made with a certain Heavenly Intention, drawn from the bottom of a pure and sincere Heart and Conscience, free from all Ambition, Hypocrisie and all other Vices which have any affinity with these, as Arrogancy, Boldness, Pride, Luxury, Mundane Petulancy, Oppression of the Poor, and other dependent evils, all of which are to be eradicated out of the Heart." "Next in order after Prayer is Contemplation." And this contemplation is to be practised by the artificer with an estimate of his own capabilities not by any means too exalted; for "that Nature should err when rightly handled, is not possible. Therefore if you shall err, return again into your way, learn the Theory more perfectly, and enquire more accurately in the method of operating."

Next follows Preparation, "which is performed by Operation of the hands that some real work may be produced;" for, says Basilius, "the praise of Science consists in experience." This maxim, however, seems occasionally to have been forgotten or perverted at the hands of our author, for even he falls sometimes into incomprehensible absurdity. He seems to have hit upon a veritable homœopathic principle when he asserts that "Venom is able to draw Venom to itself," and enforces "this Truth" by several experimental illustrations. "That the foundation of this Truth may more clearly be declared; take a venomous Toad, dry him in the Sun, shut him up in an earthen closed Pot, and by burning reduce him to ashes; then having taken out the Ashes, and reduced the same to Powder, apply of that Powder to a Wound made by Venom, and this Poyson attracts the other Poyson, and joyns it with itself. Why so, I pray? Because by this Burning which is the Calcination of the Toad, its interior Virtue is made manifest and efficacious for operating; so that Like can attract Like, and Especially Venom Venom, to itself."

Basil Valentine is particularly severe upon the doctors, returning more than once to the assault. "Whensoever," he says, "I shall have occasion to contend in the School with such a Doctor, who knows not how himself to prepare his own Medicines, but commits that Business to another, I am sure I shall obtain the Palm from him, for indeed that good Man knows not what Medicines he prescribes to the Sick; whether the colour of them be white, black, grey, or blew, he cannot tell; nor doth this wretched man know whether the Medicament he gives be dry or hot, cold or humid; but he only knows that he found it so written in his Books, and thence pretends Possession by Prescription of a very long time. . . . Vulcan himself, viz., the Prepairer of Medicaments, is not found among these men; for their Fornaces stand in the Apothecaries Shop, to which they seldom or never come. A Paper Scrol, in which their usual Recipe is written, serves their purpose to the full, which Bill being by some Apothecaries Boy or Servant received, he with great noyse thumps out of his Mortar every Medicine and all the Health of the Sick."

Pharmacy then, as a distinct profession, received apparently but little approbation from our friend Basilius.

Amidst this and a great deal more of matter certainly irrelevant, and not by any means free from bombast, we find occasionally, as has been already shown, a breath of real philosophy. The important additions to the chemical knowledge of his day undoubtedly supplied

by the labours of Basil Valentine, may make us safely overlook the errors from which he could not, with all his experimental skill, save himself. The tendency to theorise, apparently inherent in the human mind, led him very often to conclusions which certainly had no support in the experiments he adduces as their basis. He, of course, fell into the delusion common, more or less, to all experimenters, of fancying he saw many things that in reality had no existence.

It will be useful at this point to take a glance at the state of chemistry in his day. With the exception of the Arabians, with Geber at their head, it is probable that Valentine had few sources of chemical instruction. The "Doctor Mirabilis," Friar Bacon, and Raymond Lully, preceded him in time, but it is unlikely that he derived much from their works: those of the former being as yet unpublished, and those of the latter yielding little profitable. The current notions of chemical composition were made up of a strange confusion of fact and fancy. The term metal itself was indiscriminately accorded, not only to true metals, but to various sulphides, alloys, and other compounds. Every metal was thought to be compounded of two constituents, upon the relative proportion of which depended their various characters. These elementary constituents were called sulphur and mercury, but they did not always mean the bodies now known by these names. Frequently they were employed in a secondary and metaphorical sense, the bodies being taken to be typical of different abstract qualities. Mercury was, for example, the principle of volatility; sulphur was typical of decomposibility. In some cases salt was taken to be the cause of solidity and incombustibility. Valentine seems to have superposed these more modern notions upon those inherited from ancient philosophy; for he still talks of Fire, Air, Earth, and Water, and the four first qualities, Heat and Dryness, Cold and Humidity, of which they were esteemed the principles. But it must be admitted that with all the tirade in which he envelopes his account of them, his experiments appear to have been all undertaken with some definite object in view, and to have been conducted to some practical conclusion.

The first compound of antimony described by Valentine is the oxide. He makes it by exposing powdered antimony to a current of air at a moderate heat, subsequently fusing it in a crucible at a higher temperature, so as to obtain the "Pure Glass of Antimony." "The black colour which Antimony had before Preparation is now in a Spiritual manner flown up the Chimney;" and that the venom

(for notwithstanding his faith in antimony, he admits that it possesses venom) "may wholly be removed from this Glass," you are directed to extract it with vinegar, and after digestion, wash it with water, till "the Powder remain sweet and grateful."

Then put into a "Glass Body" and digest it with rectified spirit of wine, "for extracting the Tincture of Antimony, which will be high coloured and pleasantly red to amazement; and it will deposit a certain Earth, or feculency in the bottom."

He explains further on, that the flowers (sublimed oxide) of antimony may be made by "various ways as is known to every Spagyrist. There are some who drive them, mixed with Sal-Armoniack, over by Retort; then they edulcorate them, by washing away the Sal-Armoniack, and these they greatly esteem; for these Flowers are of a fair and white Colour. Others have peculiar instruments for this Work prepared with windy Caverns, through which the Antimony may receive the Air and be sublimed. Others setting three Alembicks one upon another, sublime them with strong Fire, and with one and the same labour make white, yellow, and Red Flores; all which ways I have tried and found no Error in them. But the Process by which I make Flowers of Antimony most profitable for medicine, and more efficacious in their Operations is this. I mixed the red Flowers with Colcothar of Vitriol, and sublime them together thrice. So the Essence of Vitriol ascends with them, and the Flores are more strong; which being done, I extract the same Flowers with Spirit of Wine. The Fæces settle to the bottom and separate themselves from the Spirit. These the Artificer lays aside, and distils off the Spirit of Wine in B. M.* until the Powder remains dry."

For Liver of Antimony you are to take "in the Name of the Lord" equal parts of antimony and crude tartar, and thoroughly calcine them in a crucible.

The author seems to refer to a chloride of iron when he says that vitriol and common salt give, by the application of a vehement fire, a "matter like thin butter or the Sediment of Oyl Olive."

It is a question whether the sulphide of antimony is not often intended by the name Hungarian antimony, as for example when the Regulus is described, by which no doubt is meant the metal itself. Hungarian antimony, tartar, and nitre are fused together, the operation being repeated several times. It is described as being then "bright and white, shining like Capellate Silver which hath fulminated and overcome all its lead."

* Balneo Maria.

One of the "Oyls of Antimony" described by Valentine seems to be none other than oil of vitriol or sulphuric acid. The process is certainly an advance upon that ordinarily made use of in those days, which consisted simply in burning sulphur under a large bell moistened inside, and by which the product as to quantity must have been insignificant. You are to take antimony, sulphur, and saltnitre, and fulminate them under a bell, as "Oyl of Sulphur per Camor. is made." The improvement consists in the addition of the nitre.

The chloride of antimony was also known to Basil Valentine as well as the oxysulphide. The latter he directs to be made by boiling antimony (that is, the sulphide) "with a sharp Lixivium made of the Ashes of Beech-Wood." The liquor is to be filtered and vinegar poured in, "and then the Sulphur will settle to the bottom wholly red."

Before concluding this notice, we cannot refrain fron quoting again from our author an exclamation which no chemist who has tried his hand at research can fail to join with—"O good God!" he cries; "how much is Nature absconded from Men, so that she seems to disdain to be wholly seen by us!" At the conclusion, however, he offers this exhortation: "Let him who resolves to tread in my Footsteps not be weary of searching; but what I have done, let him do, and what I have often desired, and what with so earnest Wishes I have sought, let him seek." W. A. T.

The Art of Metals, in which is declared the manner of their Generation, and the Concomitants of them. In two Books. Written in Spanish, by Alvaro Alonso Barba, Master of Art, Curate of St. Bernard's Parish, in the Imperial City of Potosi, in the Kingdom of Peru, in the West Indies, in the year 1640. *Translated in the year,* 1669, *by the R. H. Edward Earl of Sandwich. London: Printed for S. Mearne, Stationer to the King's Most Excellent Majesty.* 1674.

The Second Book [separate title-page] *of the Art of Mettals, wherein is taught the Common Way of Refining Silver by Quicksilver, with some new rules added for the better performance of the same. Written in Spanish by Alvaro Alonso Barba, Master of Art, Curate of St. Bernard's Parish, in the Imperial City of Potosi, in the Kingdom of Peru, in the West Indies, in the year* 1640. *Translated in the year* 1669, *by the R. H. Edward, Earl of*

Sandwich. London: Printed for S. Mearne, Bookbinder to the King's Most Excellent Majesty. 1674.

This is a treatise, partly theoretical and partly practical, on mineralogy. According to the author "all the inanimate things within the bowels of the Earth are reducible into one of these four kinds of mixtures, viz.: either Mettals, Stones, Earth, or Juices." By "Earth" he "means such an earthy substance as neither melts in the fire, nor dissolves in the water, as Mettals and Juices do, nor is so Compacted or hard as are Stones." "Juices" are those substances which, after being melted, do not become hard and malleable, as sulphur, allum, "Betunes" or bitumen. As regards "Mettals," which form the main subject of the work, the first question to be considered is their "efficient and formal cause." This proximate cause—independently of "the Heavens which as an universal cause, concurs in the Generation of all things,"—is a "Mineral Vertue or Spirit," which make use of "the Elementary qualities, especially of heat and cold, for its instruments," "the heat mixing uniformly the earthy and humid parts together, which is the matter whereof Mettals are made, and then boiling, digesting, and thickening that matter, and the cold coagulating and hardening it. And so it hath put on the form of Mettal, and is more or less perfect, according to the present disposition of that matter where the Mineral Spirit began to actuate it."

Now of all metals the most perfect is gold, and as it is in some sort a question of accident how a given piece of "Matter" will be acted upon by the "Mineral Spirit," it follows that the difference between one metal and another is rather of degree than of kind, and, if only human science were more advanced, they might be transmuted. And indeed do we not "see like transmutations, and far more difficult, performed both by art and nature? By art Wasps and Beetles are made of the dung of Animals; and of the plant *Alvaca*, rightly placed and ordered, Scorpions are produced. Also it is notoriously known that in *Scotland* pieces of old Ships, and of fruit that falls into the Sea turn into living Ducks; and there is no comparison between the distance of things inanimate to Animals, and that of one Mettal to another."

On the question whether metals are still in process of formation, or whether "at the Creation of the world God Almighty made the veins of Mettals in the same Condition as we now find them at this day," the author holds a very strong opinion. He thinks that those who hold the latter view do "nature a great affront by denying her (without reason) a productive vertue in this matter, which is allowed

unto her in all other sublunary things; moreover experience in divers places hath manifested the contrary."

These, however, are rather the speculative than the practical questions treated by the learned "Curate of St. Bernard's Parish in the Imperial City of Potosi," and it is due to him to add that probably his views have not gained clearness in the process of translation. F. T. M.

The English Remedy; or, Talbor's Wonderful Secret, for Cureing of Agues and Feavers; sold by the Author Sir Robert Talbor, to the most Christian King, and since (his) Death, ordered by his Majesty to (be) Published in French, for the ben (efit) of his Subjects, and now translated into English for publick Good. London: Printed by J. Wallis for Jos. Hindmarsh at the Black Bull, in Cornhill. MDCLXXXII.

Sir Robert Talbor's "Wonderful Secret" consisted apparently in preparations of quinine. He himself was, if we may trust the "Observations of the French King's Chief Physician concerning his practice in the preparation and distribution of his Remedy," an "Empirick," whose knowledge was limited to his own medicine, and who occasionally prescribed it when inapplicable, and when it did more harm than good. But this may, of course, have been professional jealousy. The book contains, besides a description of quinine, various prescriptions into which it enters, and some remarks on opium. As regards the price of Quinquina, or Jesuit's Powder, in the seventeenth century, we learn that it "hath been very various and uncertain. When it was only in the hands of the *Jesuits*, it was sold at *Rome* and *Paris* for 8 or 9 shillings *sterling* the *Dose*, which consisted only of *Two Drachms*; but so soon as *Droguists* began to Trade in it, it began to fall in Price, so that *three* or *four* years ago, the best might have been had for about *Forty* Shillings the Pound weight; but no sooner began the *English* Remedy to be in vogue, but men began everywhere to make experiments with the Bark of *Peru* which much enhansed the value of it." F. T. M.

A Course of Chymistry, containing the Easiest Manner of performing those Operations that are in Use in Physick. Illustrated with many Curious Remarks and Useful Discourses upon each Operation. Writ in French by Monsieur Nicholas Lemery. Translated by

Walter Harris, Doctor of Physick. London: Printed for Walter Kettilby at the Bishop's Head in St. Paul's Church-Yard. 1677.

This work is well worthy of perusal. It is particularly instructive because it presents in a coherent and intelligible manner some of the principal theories held at that date respecting the constitution of bodies in general, and a distinct theory of chemical action. The doctrine entertained by the ancients on the subject of terrestrial and cosmical corporeality was that which, actually or metaphorically, has obtained at all times a considerable share of attention. They held that the four so-called elements, fire, water, earth, and air, were the principles of which the infinitely various forms of body constituting the material universe were built up. It is far from improbable, however, that the ancient philosophers held opinions on this subject which have not come down to us in their integrity. The diverse and generally correct acquaintance with natural objects possessed by them, as well as their proficiency in processes of reasoning, forbid us to believe that they did not invest these terms with a signification more recondite than we are accustomed to fancy.

But when experiment came to be practised extensively, it was soon found out that this crude notion was inadequate to express or to explain all the phenomena which, in so rapid succession, introduced themselves. Then was invented that other set of principles devised by the alchemists, to replace those which since long before the Christian era had been generally accepted.

Fire, of course, was soon discarded from the list of elements; and salt, sulphur, and mercury, from their wonderful properties, and from the incapacity of the chemists of the time to resolve them further, were elevated to the rank of principals.

Lemery commences by giving a definition of chemistry. It is not of much importance as a definition, but is interesting from being one of the first to attribute to chemistry a less visionary aim than the discovery of a universal elixir, or the production of a general solvent.

"Chemistry," he says, "is an Art that teaches how to separate the different substances whith are found in Mixt Bodies. I mean by a Mixt Body those things that naturally grow and encrease, such as Minerals, Vegetables, and Animals." And then he goes on to treat of *the Principles of Chymistry*. We will let him appear in his own words.

"The First Principle that can be admitted for the composition of Mixts, is an Universal Spirit, which being diffused over all the World, produces different things according to the different Matrixes

or Pores of the Earth in which it settles. But because this Principle is a little Metaphysical, and falls not under our senses, it will be fit to establish some sensible ones. Whereas the Chymists in making the Analysis of Mixt Bodys have met with five sorts of Substances, they therefore concluded that there were five Principles of Natural things,—Water, Spirit, Oil, Salt, and Earth.

"The spirit which is called Mercury is the first of the Active Principles. 'Tis a subtile, piercing, light substance that is more in motion than either of the others. It cannot be drawn pure no more than the others. But either it is involved in a little oil, that it carries along with it, and then may be called a Volatile Spirit, such as the Spirit of Wine; or else is detained by some salts which check its volatility, and then may be called a fixt Spirit, as the Acid Spirit of Vitriol, Alum, Salt, etc.

"The Oil which is called Sulphur, by reason of its inflammability, is a sweet, subtile, unctuous substance, that comes out after the Spirit. This is said to cause the diversity of Colours and Smells, according to its disposition in Bodys.

"Salt is the last of the Active Principles which remains disguised in the Earth after the other Principles are extracted. It is drawn by pouring water upon the Earth to imbibe its Salt; then filtering the Dissolution and evaporating all the Moisture, a Salt is found at the bottom of the Vessel.

"There are three differences of Salt, as Fixt, Volatile, and Essential.

"Water, which is called Phlegm, is the first of the Passive Principles; it comes in distillation before the Spirits when they are Fixt, or after them when they are Volatil.

"The Earth, which is called *Caput Mortuum* or *Terra Damnata*, is the last."

The nature of solution, and the action of chemical agents in effecting the solution of metals, was attributed even earlier than the date of this work, to the penetration of the solvent and solvend into each other's pores.* Numerous remarks are scattered through Lemery, which show that he adopted this view.

"For example, if you mix an Acid Spirit with the Salt of Tartar, or some other Alkali, the edges of the Acid will so insinuate into the Pores of the Salt, that if by distillation you would separate the Acid Spirit again from the Salt, you'll never be able to effect it, because the edges of these Spirits are so far destroyed or changed that they no longer preserve their former figure.

* See *Chemical News*, vol. xxii., Nos. 555 and 557, on Solutions.

"Tin is a Metal which comes near unto Silver in colour, but differs very much in the figure of its Pores, in the solidness and weight."

And again, salt of tin is said to be "nothing else but the Acids of Vinegar, incorporated into the particles of Tinn."

Writing of the action of acids upon coral, the author says,—"Coral being an Alkali, the Acid points do stick in it, and holding up its parts, do render them imperceptible; and this is the reason that the Vinegar doth intirely lose all its acidity, because the acidity did only consist in the motion of its points, which do now sheath themselves in the Alkali"* This is a curious example of the fallacies it is so easy, in such matters, to fall into, and shows how cautious one ought to be in adopting theories.

Lemery seems to have but little faith in the planetary sympathies and influences, although everybody in his day believed in them firmly, for he speaks of silver as being "called by the name of the Moon, as well from its colour as from the Influences our Forefathers thought it received from the Moon." Lower down he says, "There is no need I should enlarge in confutation of this opinion, experience every day teaches us that it is a pure abuse."

Disseminated through the work are a number of very shrewd and sensible observations, which certainly justify the formal "approbation" it received from the "Faculty of Physick in Paris."

W. A. T.

A Compleat Body of Chymistry; Wherein is contained whatsoever is necessary for the attaining to the Curious Knowledge of this Art; Comprehending in General the whole Practice thereof; and Teaching the most exact Preparation of Animals, Vegetables, and Minerals, so as to preserve their Essential Vertues. Laid open in two Books, and dedicated to the Use of all Apothecaries, etc. By Nicasius le Febure, Royal Professor in Chymistry to His Majesty of England, and Apothecary in Ordinary to His Honourable Household. Rendred into English, by P. D. C. Esq., one of the Gentlemen of His Majesties Privy Chamber. (In Two Parts.) With Additions. London: Printed for O. Pulleyn, Junior, and are to be sold by John Wright, at the Sign of the Globe, in Little Britain. 1670. *pp.* 320.

"The Subtil Van Helmout," "the laborious Glauber," "from

* He also read to the French Academy a memoir, embodying a distinct enunciation of this theory.

their works and Paracelsus, we acknowledge to have compiled this Abridgement of Theoretical and Practical Chemistry, which we shall divide in two parts: The first containing the Theory, the second the Practice of the Art."

The first part comprehends a detailed description of the five recognised chemical principles,* a dissertation on the principles of life and death, on purity and impurity, and other matters. The second or practical part of the work commences at page 67, and occupies the remainder of the volume. In addition to the description and delineation of vessels adapted to various chemical operations, it supplies a collection of recipes, amongst which, however, are none that are particularly remarkable W. A. T.

The Anatomy of Plants; with an Idea of a Philosophical History of Plants. And several other Lectures, read before the Royal Society. By Nehemiah Grew, M.D., Fellow of the Royal Society, and of the College of Physicans. Printed by W. Rawlins, for the Author. 1682. *Fol., pp.* 24 *and* 304, *with* 83 *plates.*

To the learned and distinguished author of these lectures we are indebted for the foundation of structural and physiological botany. In these lectures are described, in terms indeed which have been superseded, but with an accuracy which has hardly been eclipsed by later performances, all the parts of plants which are visible not only to the unassisted eye, but also many of those which require the help of a microscope.

Dr. Grew was among the first, if not actually the first, to ascribe to the essential organs of flowers a sexual character. In the lecture on the Anatomy of Flowers, he describes their *Empalement* (involucral appendages), *Foliature* (envelopes), *Attire Seminiform* (stamens), and Fruit. The book is abundantly illustrated with dissections of flowers and fruits, leaves, stems, and roots.

The Royal Society, before whom the lectures were originally delivered, and to the fellows of which this volume is dedicated, was but young at the time of their publication. In this work, however, we may see a worthy forerunner of those Philosophical Transactions which under the auspices of that body have for the last two hundred years, been regularly dispensed to the world. W. A. T.

* See "A Course of Chemistry" by Lemery.

The Cure of Old Age, and Preservation of Youth. By Roger Bacon, a Franciscan Frier. Translated out of Latin; with Annotations and an Account of his Life and Writings. By Richard Browne, M.L. Coll. Med. Lond. Also a Physical Account of the Tree of Life, by Edw. Madeira Arrais. Translated likewise out of Latin by the same Hand. London: Printed for Tho. Flesher at the Angel and Crown, and Edward Evets at the Green Dragon, in St. Paul's Church-yard. 1683.

Though the leading circumstances in the history of Roger Bacon are familiar to us, the details of his life are wrapped in obscurity. He was born at Ilchester, in Somersetshire, in the latter part of the reign of King John, about 1214. He studied first at Oxford, but afterwards went to continue his studies in Paris, which was then much celebrated through Europe as a seat of learning. Returning about the year 1240 to Oxford, he became a Franciscan friar, and gave himself up to the pursuit of science. The discovery of gunpowder and the invention of a considerable number of valuable optical instruments are ascribed to him. We have but very little evidence of this, but we know with certainty from the numerous writings undoubtedly his, which have come down to us, that he was a most accomplished man. A grammarian and logician, with a knowledge of Latin, Greek, and Hebrew, he was able to search the Scriptures in the original tongue, and he anticipated the work of the Reformation by looking to that source for the foundation of his theology. A mathematician and astronomer, a chemist and physician, his amazing erudition placed him in advance of his times, and brought down upon him the malice of his less learned contemporaries. One of the charges brought against him was the old one, that of practising magic. That it was justly founded there can be little doubt. Almost all who made any pretensions to science in that day had a hankering after the *black art*. Looking back at them and their doings through the mist of time, it is impossible for us now to judge fairly of their sentiments or actions. That impostors were numerous we know, but we do not know how many earnest searchers after truth, having but lifted the corner of the veil, were compelled wonder-stricken, to fall back into the darkness. The glimpse of wonders which thus bewildered and blinded them was the natural outcome of their own labours, but want of familiarity scared them from true interpretation.

Bacon's great fault was that he knew more than his fellows, so he was cast into prison, and regained his liberty only about four years

before his death. He died in 1292. Out of the immense multitude of works attributed to him it is probable that some had a different origin. His "Opus Magus" is the book usually regarded as his great achievement, for in it he enunciates clearly the fundamental principle upon which his reputation as a philosopher rests. He was the first distinctly to oppose the exercise of experience to the teachings put forward under authority. It may well be imagined that a doctrine so repugnant to the practice of the age would acquire for him no followers; hence the obscurity enveloping his works.

The translator of the volume before us deplores the dispersion of his writings; "and what," he says, "do survive the injury of Time are difficult to be procured. For they lye hid in Manuscript, and either through the Envy or Ignorance of the Owners are suppressed." A fact which remains to the present day. So little appreciation by his own countrymen of Roger Bacon's astonishing originality of thought has been shown indeed, that he is indebted to an admiring foreigner for the only connected notice of his life and literary and philosophical labours at present, so far as we have been able to ascertain, in existence.*

This volume concerning the "Cure of Old Age" is called by the translator the choicest and most useful of all his pieces. It is divided into sixteen chapters. The first enumerates the Causes of Old Age. Old age seems in this instance to mean decay and decrepitude. The opening words are as follow: "As the World waxeth old, Men grow old with it; not by reason of the Age of the World but because of the great Increase of living Creatures which *infect* the very Air, that every way encompasseth us, and

"Through our *Negligence* in ordering our Lives, and

"That great Ignorance of the Properties which are in things conducing to Health which might help a disordered way of Living, and might supply the defect of due Government."

Chapter ii. treats of "Remedies against the Causes of Old Age."

"Wise Physicians have laid down two ways of opposing these Causes; One is the *Ordering of a man's way of Living:*

"The other is the *Knowledge* of those *Properties* that are in certain things which the Ancients have kept secret."

"But," it is added farther on, "the Use of these things and Medecines is of no use, nor anything avails them that neglect the Doctrine of the Regiment of Life. For how can it be, that he who either is ignorant or negligent of Diet, should ever be cured by any pains of the Physician, or by any Virtue in Physick?"

* Roger Bacon: sa Vie, ses Ouvrages, ses Doctrines, d'après des textes inédits. Par Em. Charles, Docteur-es-Sciences. Hachette: Paris. 1861.

"Resistendum senectuti est, ejusque vitia diligentiâ compensanda sunt. Pugnandum, tanquam contra morbum, sic contra senectutem. Habenda ratio valetudinis; utendum exercitationibus modicis, tantum cibi et potionis adhibendum, ut reficiantur vires non opprimantur. Nec vero corpori soli subveniendum est, sed menti atque animo multo magis; nam hæc quoque, nisi tanquam lumini oleum instilles, exstinguuntur senectute."—*Cic.*

Chapters iii., iv., v., and vi. describe "the Accidents of Old Age and the Causes of them, and the Signs of Hurt in the Senses, Imagination, Reason, and Memory."

"The satirical rogue says here that old men have grey beards, that their faces are wrinkled, their eyes purging thick amber and plum-tree gum, and that they have a plentiful lack of wit, together with most weak hams."

Why the "words" which the Prince of Denmark was reading when he answered thus to Polonius must have been in this very book!

(A Latin edition, *Libellus de retardandis senectutis accidentibus et de sensibus Conservandis*, bears date, 1590. Hamlet first appeared in 1603.)

Chapter vii., discoursing of "Meats and Drink," says that "all Meat by how much the more savoury it is, by so much the better it nourisheth."

The character of the medicaments used and recommended by Bacon, and his enigmatical way of indicating them, may be gathered from several places in this book. In the eighth chapter he says, "Things that defend the Natural Moisture from Dissolution, and when restored, that render it more Sincere, are three. One whereof swims in the Sea. Another is hid in the inmost Recesses of the Earth. The Third is usually found in the Bowels of the Animal that lives long." The explanation furnished by the translator is that the first is coral; the second, gold; and the third, the "Bone of a Stag's Heart."

In the next two chapters our author writes of things prejudicial and of things beneficial to old men. The remaining chapters touch upon the preservation of youth and vigour; they are chiefly in "obscure and difficult terms," making free use of metaphor. Moderate wine drinking is recommended to old men, but forbidden to the "Young and Hot." "The flesh of the serpent, when prepared," is extolled highly. "A chearful mind," it is said, "brings

Power and Vigor, makes a Man rejoyce, stirs up Nature and helps her in her actions." "Whence in conclusion it is made manifest that Mirth, Singing, Looking on Humane Beauty and Comeliness, Spices, Electuaries, warm Water Bathings, some things lying in the Bowels of the Earth, others lying hid among the Waves of the Sea, some living in the Air, others taken from the Noble Animal, well tempered and prepared, and many more such things are Remedies, whereby the Accidents of Age in Young Men, the Infirmities of Old Age in Old Men, the Weaknesses and Diseases of Decrepit Age in very Old Age, may be restrained, retarded, and driven away." W. A. T.

The Secrets of Physick and Philosophy divided into two Bookes. Translated by John Hester, from the German of Theophrastus Paracelsus. 1633.

"Part I. A Perfect Order to make Oyles. Part II. Of preparing of Mineralls."

It possesses little literary interest.

John Hester, it appears, was imprudent in his youth: he sowed to the wind, and reaped the whirlwind. Repentance came, and he took to study. "So that what experiences soever I have digged out of hard stones, blowne out from hot fire, raked out from foule ashes, with great cost, and greater travaill, that thou hast heere in my Booke to see, and in my shop to use with great care at thy commandment." For these, and all other mercies, judging from the contents of the volume, we are not truly thankful. J. I.

Val. Cordi Dispensatorium, sive Pharmacorum conficiendorum ratio. Petro Covdebergo, Pharmacopœio Antuerpiano, plus quadringentis erroribus liberata atque vindicata, scholiisque illustratæ. Adjecto, Valerii Cordi novo libelio, alliisque paucis post præfationes annotatis. Quid porrò à Matthia Lobelio præstitum sit, sequens pagina indicabit. Lugduni Batavorum. Ex Officina Plantiniana apud Franciscum Raphelengium. 1690. *His accessit Diarium Pharmacorum parandorum Simpliciumque colligendorum à Matthia Lobelio.*

The rest need not be quoted, and the dedication may safely be passed over—it betrays the stereotyped phrases of the period. The chief feature of interest is a short tractate on what should make a

perfect pharmacist. "Qualem virum Pharmacopœum esse deceat." This essay seems worth translation; its meaning is as follows:—Medicine is the great safeguard respecting health, and the pharmacist should be the right hand of the physician. Should the latter supply inferior or adulterated drugs, two evils follow. The patient may be injured, and the physician led astray. Chiefly let the pharmacist know the Latin language, "non vulgariter tantum, sed ad munditiem et proprietatem usque peritum esse oportet, ut ea quæ eruditi Medici, vel in genere, vel in specie ipsi præscribunt rectè et ex actè intelligere possit."

Our own Pharmacopœia is now in English, because that is the language understood by the common people—in the next issue probably it will be in easy words of one syllable. It is the duty of the pharmacist to distinguish good from bad, and by sight, taste, smell, and other means to assure himself respecting the best preparations. He must know further how to prepare medicines in convenient vessels, and the proper season in which to select, as also how to keep herbs, flowers, fruits, seeds, and roots. Let not greed of gain favour the exhibition of inferior articles, and when in doubt as to unusual remedies, let him consult the physician. Once a month he must examine his stores (an unneeded precaution in a well regulated pharmacy); and lastly, he must not be given to dice, or games of chance, nor delight in drink, nor be entangled in the wiles of Venus. "Alea enim negligentiam parit ebrietas, errores, oblivionem et stuporem inducit turpis verò amor, etiam veneficia illi extorquere possit." But, *omninò*, by all means, he must be married *si fieri potest.* To this be added true piety, a fear of God, faith in Christ, charity towards a neighbour, and a hope of a life to come; then all things will be safer, brighter, and happier. This whole paragraph, pp. 18 and 19, we commend to the modern reader. It is a fair specimen of the thought and Latinity of the time.

The remainder of the book needs no description. So great a change has been effected in our ordinary formulæ, that the long list of aromatic and opiate confections, syrups, pills, and ointments of Cordus belong entirely to the past. Amongst them, various modes are given for mixing the Mithridate, to which a note is appended, stating that Dr. Solomon probably borrowed the idea of his Balm of Gilead from this useless compound. Still I well recollect rows of white jars with blue stripes, containing this class of preparations. Time used them hardly, and the public were slow to estimate their value, and eventually they became good specimens of fungoid growth. The Rob is well known. It is simply an expressed juice

evaporated to a thin extract, with or without sugar. Meat tablets anticipated the manufactury at Clapham, and were made thus :—

"℞ Carnis viperinæ cum anetho, sale et aqua coctæ, ʒviij.
Panis tritici purissimi triti et cribrati, ʒij.
Make S. A."

The Oleum ex ligno Juniperi is described, and Oleum Nenupharis Citrini, the use of which latter in the shape of Extract (Ext. Nenuphar. lut.) has been revived in the North. A touching epitaph on Valerius Cordus ends his portion of the work, the rest having been contributed by two friends. Impelled by a strong desire for knowledge, he travelled over Germany, then went to Italy. He was held in honour at Venice, but had scarcely entered Rome than the Great Physician called him to his rest. J. I.

Difficiles Nugæ: or Observations touching the Torricelian Experiment, and the various Solutions of the same, especially touching the Weight and Elasticity of the Air. The second Edition, with some occasional Additions. London: Printed by W. Godbid, for William Shrowsbury, at the sign of the Bible in Duck-lane. MDCLXXV.

Why should the column of mercury in a glass tube, closed at one end, subside "to the height of 29½ inches, or near thereabout"? Most certainly not, held the anonymous author of this treatise, because it was kept at that altitude by the weight of the atmosphere. For "the common appearances of the World, so far as they are obvious to our common senses, contradicts this immense, nay, or any considerable Gravitation of the Atmosphere upon subjected Bodies. It is hardly conceptible how Birds could raise themselves upon their wings, and keep themselves in free Ayr, if a burthen perchance of above 1000 pound weight should lie upon their Wings and Bodies; it were not possible for me to breathe, to walk, to stand upon my Feet. If at every time I open my Mouth, a Column of Ayr of 300 pound weight were pressing into it, it would tear open the valves of my *Larinx*, and blow up my Stomach and Intrals, like a Bladder, and break my Ribs, if it had an admission; and if it had not, the circumjacent pressure of the Ayr, would press me to death. These and the like instances render this prodigious Gravitation of the Ayr incredible to us vulgar Souls that are apt to credit our senses."

But, if the atmospheric theory be thus inadmissible, what is the true explanation of the phenomenon?

In order to discover this it is necessary to inquire what is left in that portion of the tube from which the mercury has receded. Not a vacuum, or not "Nothing," as the author expresses it. And here again a common-sense experiment is decisive. For if the inverted tube be closed at the upper end with the finger, "a strong and sensible attraction is wrought upon the pulp" of that finger as the mercury descends. "Now this attraction is impossible to be without the contiguity of some Body to the pulp of the finger. . . . And they that go about to tell us that it is not Attraction or Suction by any power within the Tube, but by the pulsion of the incumbent column of Air, need no other confutation than their own sense to assure them the contrary; for, most evidently, the force that the finger feels is from within, and not from without."

This force is the attraction of a "subtle corporeal substance extracted from the gross Mercurial Body, or forced out of it." And in the same way that it attracts the finger at one end, so it holds up the mercury at the other, though why the mercury should invariably, whatever the length of the tube, be held up at a height of "29½ inches, or thereabout," is not very clearly explained.

It is just to add, that though the author relied much on his common-sense experiments, he did not rely on them altogether, and was perfectly aware of the replies given to his arguments by the "New-fangled" philosopher, who held the view opposed to his own. But then he could not but consider "How strangely partial men are to those Sentiments that they have once entertained, and perchance taken much pains to mould and fashion, or have even publickly engaged to or for; whereby it comes to pass that men are not willing impartially to consider what makes against their opinion, and frame a thousand imaginations to evade the strength of the opposite reasons, and to construe all appearances (as Melancholick persons do the sound of Bells) to speak what they fancy; and possibly all the opposite opiniators in this business are under the like partiality and indifferency." F. T. M.

Philosophical Tracts.

I. On the Animal Calculus. (Full title not given.)

This is the record of a series of experiments for dissolving calculi.

II. Philosophical Experiments: containing Useful and Necessary Instructions for such as undertake long Voyages at Sea. Shewing how Sea-Water may be made Fresh and Wholesome; and how

Fresh Water may be preserved Sweet. How Biscuit, Corn, etc., may be secured from the Weevel, Meggots, and other Insects. And Flesh preserv'd in hot climates, by Salting Animals whole. To which is added an Account of several Experiments and Observations on Chalybeate or Steel Waters; with some Attempts to convey them to distant Places, preserving their Virtue to a greater Degree than has hitherto been done. Likewise a Proposal for cleansing away Mud, etc., out of Rivers, Harbours, and Reservoirs. Which were read before the Royal Society, at several of their Meetings, by Stephen Hales, D.D., F.R.S., Rector of Farringdon, in Hampshire, and Minister of Teddington, Middlesex. London: Printed for W. Innys and R. Manby, at the West End of St. Paul's; and T. Woodward, at the Half Moon, between the Temple Gates in Fleet Street. MDCCXXXIX.

The title sufficiently explains the object of the papers composing this pamphlet.

III. The Naturalists and Travellers Companion, containing Instructions for Collecting and Preserving Objects of Natural History, and for promoting Enquiries after Human Knowledge in General. By John Coakley Lettsom, M.D., F.R.S., and A.S. The Second Edition, corrected and enlarged. London: Printed for E. & C. Dilly, in ye Poultry. 1774.

The first eighteen pages missing, a kind of traveller's *vade mecum*, furnishing hints respecting the various points to be studied in foreign lands.

IV. A Description of the Influenza, with its Distinction and Method of Cure. By R. Hamilton, M.D., and Fellow of the Royal Medicinal Society of Edinburgh. London: Printed for J. Johnson, No. 72, St. Paul's Churchyard. 1782.

V. A critical Enquiry into the Ancient and Modern Manner of Treating the Diseases of the Urethra. (No title-page.)

VI. A Sketch of the Life and Character of the late Dr. Monsey, Physician to the Royal Hospital at Chelsea; with anecdotes of Persons of the First Rank in Church and State. Ille antem sui judicii potius quid se facere par esset arbitrabatur quam quid alii laudaturi forent.—Nepos. London: Printed for the Author by J. Cooper, Bow Street, Covent Garden. MDCCLXXXIX.

This is rather a social than a scientific biography.

VII. A Discourse on the Nature, Causes, and Cure of Corpulency. Illustrated by a Remarkable Case. Read before the Royal Society, November, 1757, *and now first published by Malcolm Flemyng, M.D. London: Printed for L. Davis and C. Reymers, Printers to the Royal Society, over against Gray's-Inn, Holborn. MDCCLX.*

This precursor of Mr. Banting recommends, of course, moderation in diet as a means of preventing corpulency, and also exercise, cold bathing, and the occasional use of purgatives. But the remedy on which he chiefly relies is soap—"Spanish soap, particularly that from Alicant." This will carry off the fat through the bladder. The mode of administering recommended is this:—"A drachm may be tried for the first four or five days: and if that creates no remarkable disorder in the stomach or bowels, the quantity should be increased to two, three, and in very stubborn cases to four drachms; which last dose, I think, needs not in any case to be exceeded." The medicine should be taken at bedtime. Dr. Flemyng quotes the case of a medical friend on whom this treatment was found to be most successful.

VIII. An account of the Tilbury Water, containing a Narrative of the Medicinal Qualities of this Spring; Experiments on the Water; Observations on the Experiments; the Virtues of the Water, interspersed with various Cases; the Manner of Drinking it; and, lastly, several remarkable Cures. Aquæ lene caput sacræ Avertit morbos, metuenda pericula pellit.—Hor. The Fifth Edition, with Alterations. London: Printed for John Ellison. MDCCLXXXI.

F. T. M.

The Royal Pharmacopœa Galenical and Chymical according to the practice of the most eminent and learned Physicians of France, and published with their several Approbations. By Moses Charras, the King's chief Operator in his Royal Garden of Plants. Printed for John Starkey at the Miter within Temple Bar, and Moses Pitt, at the Angel in St. Paul's Church-Yard. 1678.

This handsome folio was written under the immediate superintendence of Monsieur Anthony d' Aquin, First Physician in the French court. Attention is directed to the list of "Physick Books printed for John Starkey;" among them will be found the treatise called the "Golden Calf." Very little can be gleaned by way of extract: some old terms occur. *Sapa* is the juice of grapes evaporated to a Rob; *Athanor* is a digesting furnace meant to retain heat; and *Aludel*

is a series of subliming pots placed one over the other without luting.

A collection of recipes concludes the volume. They have been entirely superseded, though this one might prove useful:—"An Ointment to catch Fish.—Take man's and cat's fat of each half an ounce; mummy finely powdered, three drams; cummin seed finely powdered, one dram; distilled oils of anise and spike, of each six drops; civet and camphire, five grains. Make an ointment according to art. This ointment hath a wonderful vertue to draw fish. Rub the line with it, and bait the hook with an earth-worm, and then holding the line a while in the water, you shall see the effects of it."

J. I.

Essays and Observations on the Construction and Graduation of Thermometers, and on the Heating and Cooling of Bodies. By George Martine, M.D. The Fourth Edition. Edinburgh: printed for Alexander Donaldson. MDCCLXXXVII.

A MS. note on the binding describes this as "a valuable and scarce book." It consists of four Essays, of which the first relates to the "Construction and Graduation of Thermometers," and contains a history of the instrument, a disquisition on the various liquids adopted in its construction (including the linseed oil used by Newton), and an examination of the various systems of graduation adopted by philosophers. The second Essay is on the different results obtained from various kinds of thermometers. The third is on the heating and cooling of bodies. The fourth and longest, which is divided into eight articles, is described as "an Essay towards a natural and experimental history of the various degrees of heat in bodies." The subjects treated are, "the way of computing the different degrees of heat; the heat of the air; the comparative heats of the sun, earth, planets, and comets; the degrees of heat in animals, the preternatural heats of animals; the heats of waters, oils, and salts, according to their fluidity and consistency; the melting and shining heats of metals and minerals; the boiling heats of liquid and melted bodies."

F. T. M.

The Secretes of Alexis; conteyning many excellente remedyes agaynst divers deyeases, woundes, and other accydentes. Done into englyshe by W. Warde. A worke wel approued and very necessarie for al menne. By H. Bynneman. 1568.

This curious old volume, which is printed in black letter, is divided into five books, and is made up of 122 *leaves*. It is one of its peculiarities that the leaves, not the pages, are numbered, and consequently that leaf 122 is page 244. Unfortunately the title-page is missing, and it is somewhat worn and discoloured with age. There are so many curiosities in this venerable production, that it may be permitted here to select and present a few of them, although a complete account of the work has already been published. (*Pharmaceutical Journal*, Feb., 1867.)

The six books into which the work is divided may be said shortly to be devoted severally to these six subjects:—

1. Remedies for Disease.
2. Perfumes.
3. Conserves.
4. Cosmetics.
5. Dyes.
6. Chemical Recipes.

It is, in fact, an old wife's pantry book, with the single difference that the respectable compiler is not (as Artemus Ward would have said) a female woman, but rejoices in the title of "reverent Maister." There are scattered up and down the country not a few worthy huswifs (blessings on them!) who store up their cherished secrets exactly as did Don Alexis his, as he tells us in his preface: and these, transmitted to them from their mothers with a seasonable degree of mystery, have gradually accumulated about them in the mouldiness of antiquity that sanctity which seems to forbid (as did those of Alexis) that they should be made "publike and common." Don Alexis, unto the gentle reader, lets you know that he has learned "many goodly secretes not alonely of men of great knowledge and profound learning and noble men, but also of poor women artificers, peysantes, and al sortes of men." So that he went to the fountain-head; for as every one knows, the old women are to this day the repository of all the hidden arcana of popular physic.

How Charles Lamb would have revelled in this book! He could not have denounced it as a scientific treatise, nor stigmatised it as one of "those volumes which no gentleman's library should be without."

The first chapter tells of "the maner and secrete to conserve a man's youth, and to holde backe olde age; and to maintaine a man alwayes in health and strength, as in the fairest flower of his age."

As we turn over the pages, we come, half way through the volume, to matters of such deep moment and grave import as this: "To

make Oyle Imperiall to perfume the heare or beard of a man, to rubbe his handes or gloves with, and to put also into the lye or water wherein princes or greate men's clothes be washed."

And those who are blessed with that remarkable organ, a sweet tooth, may learn how "to make a paste of sugre, whereof a man maye make all maner of fruites, and other fyne thinges with theyr former, as platters, dishes, glasses, cuppes, and suche like thinges, wherewith you may furnishe at table; and when you have doen, eate them up. A pleasant thing for them that sit at the table." [The last sentence belonges to Don Alexis.]

But not to tantalise the reader further by the mere enumeration of these rare and profitable secrets, let us offer to him the details necessary for the due confection of at least one of them. What does he say to a spoonful of marmalade or a dish of stewed quinces?

We can supply him with sweet waters for the head and beard, a composition of melons (very exquisite) or the invaluable "oyle of redde dogge" touched up with scorpions and earth worms. Or is it rejuvenescence that he especially pines for, he will here find one very good water to make the face appear of the age of twenty-five, and another of such marvellous potency that he may have even ten more years abstracted from his, perchance, already completed sum.

Listen all ye ladies fair, that would be fairer, to this "advertisement or lesson for them that wyll make the heare fall off."

"Fyrste you muste note that the heare will not fall awaye, but whan the mone decreaseth, that is to-day, in the quarter of the wane, and it is far better to make them fal off with the oyntmente or with oyle, than to plucke them out with a paire of pincers, as some gentlewemen do use in Fraunce, because it doth violence unto the flesh, moveth the bloud, and enlargeth the pores, and also maketh the heare to growe againe greater.

"Therefore in al sortes it is good to annoynte by and by the place with some coolinge or refreshing oyle, as oyle roset, or of violettes. Likewise, you must understande that oftentimes the oyntment beynge mixed with Orpiment, burneth the skinne, and that commeth by the naughty or to stronge composition of it, or whan a man letteth it drye to longe upon the place, or without fyrst washinge the place with hote Water, or whan a man annointeth not the place by and by after the heares be fallen, as we have sayd before."

Seriously, however, we recognise here a familiar acquaintance in the "Pylles of mayster Michaell a Scot, the which heale the griefe or payne of the heade, bee it inveterate or recent, purge the brayne, claryfye the syghte, cause a man to have a good memorye, good colour in the face, and be also verye good for many infirmities.

"Ye shall take of Aloe washed iii scruples, the rootes of wilde gourdes of all sortes of mirabolanes, of the confection made with Scamony, called Diagridion, Mastic, Baye berries, and Roses, of eche of them halfe a dragme; of Saffron, a scruple; Myrrhe half a scruple; Stampe all well together and make then of Pilles with the juice of Colewortes, and take three or foure of them when you go to bedde, everye thyrde or fourth daye once."

But the commentator already alluded to has fully set forth all these things, and we can therefore do no more than point the notice of the curious to the orthography, illustrated by the extracts here given, and by his careful persual of the account to which reference has been made. W. A. T.

Raimundi Lullii Majoricani philosophi sui temporis doctissimi libelli aliquot chemici: nunc primum excepto vade mecum in lucem opera Doctoris Toxitæ editi. Quorum omnium nomina versa pagina dabit. Cum Privil. Caes. Majest. ad decennium. Basilicæ: Typis Conradi Waldkirchii. Anno 1600.

Raymond Lully was born in Majorca, 1225. He was therefore the contemporary of Roger Bacon. More decidedly orthodox than that illustrious man, his works suffered less risk of oblivion, and most of them, if not all, found admirers willing to take up the office of commentator and publisher. Having studiously neglected or distorted the grand precept of Roger Bacon, "experiment," the art of Chemistry had advanced not a step, when three hundred years afterwards, it still found such a book as this of old Raymond Lully's acceptable as a guide.

His "Testamentum Novissimum" occupies a goodly proportion of the volume before us. In it there is much that is curious, little instructive. Theoricam et praxin habetis scientiæ laudatissimæ.

Lully was a notable adept in the art of transmutation, or *multiplication* as it was called; and the story goes that he converted iron into gold in the presence of Edward I., here in London. In his account of his experiments, he usually concludes with "lauda Deum et memento semper pauperum." In almost all the experiments in which gold is said to be produced, gold is itself an ingredient in the "Medicine" made use of in the "projection." How wilfully these experts deceived themselves as well as others any one who is curious in such matters would be able to satisfy himself by examining this book. He will find some of the details sufficiently tedious.

W. A. T.

A Description of New Philosophical Furnaces, or a new art of Distilling, divided into five parts. Whereunto is added a Description of the Tincture of Gold, or the true Aurum Potabile also the first part of the Mineral Work. Set forth and published for the sakes of them that are studious of the truth. By John Rudolph Glauber. Set forth in English by J. F. D. M., London. Printed by Richard Coats for Tho. Williams at the Signe of the Bible in Little Britain. 1651.

We come very early in the book upon the spirit of salt, how it is to be distilled. Glauber recommends to mix "salt and vitriol or allome together," and then "to cast this mixture into the fire," in one of his furnaces devised for the purpose. "And if thou knowest how to work aright, thou mayest easily every hour make a pound of the spirit." And this pre-eminence is given to this preparation because "few exceed it in strength and vertues." "The *Caput Mortuum*, which is reddish, easily falls with the ashes through the grate, and can no more be distilled, but yields by excoction a white fixed salt, which serves for the flowing of metals; and being dissolved in warm water serves also for a glyster against the worms, which it kills, and purgeth also the bowels." A few years afterwards, Glauber substituted oil of vitriol for vitriol or alum, and then he recognised in the Caput Mortuum that "sal mirabile" which is associated with his name.

Another discovery which has been attributed to Glauber is the method of obtaining wood vinegar, or acetic acid, by destructive distillation of wood. In the first part of his Philosophical Furnaces, he describes "how an acid spirit or vinegar may be distilled out of all vegetables, as herbs, woads, roots, seeds, etc." "Now this spirit (being rectified), may commodiously be used in divers Chymical operations, for it doth easily dissolve animal stones, as the eyes of Crabs, the stones of Perches and Carps, Corals also and Pearls, etc., as doth vinegar of wine." He adds also, "that out of the ashes may be extracted, by warm water, a salt (carbonate of potash) which being again dissolved in its own spirit or vinegar and filtred, doth by the evaporating of flegme, being placed in a cold place, pass into a Crystalline salt, which is of a pleasant taste." So that he had here a new process for foliated tartar.

Glauber was essentially an experimenter. This book of his is made up entirely of practical details; he rarely enters into theoretical explanation or discussion. The natural result was that he got through a great deal of useful work, and left behind him an example and a name. W. A. T.

The Conclave of Physicians. In Two Parts. Detecting their Intrigues, Frauds, and Plots against their Patients, and their destroying the Faculty of Physick. Also a Peculiar Discourse of the Jesuits' Bark. The History thereof, with its true Use and Abuse. Moreover, an account of some eminent Cases and new Principles in Physick of greater use than any yet known. The second Edition with many Alterations. By Gideon Harvey, M.D., Physician in Ordinary to His Majesty. London: printed for James Partridge, Stationer to his Royal Highness, George, Hereditary Prince of Denmark, and sold at his shop at the Post-house, between Charing Cross and Whitehall. MDCLXXXVI.

This is a very witty and amusing book. Dr. Harvey was evidently a wag, and possessed a fine vein of caustic humour. He professes throughout that his attacks are only levelled against the "errors, frauds, and male-practice of some Physic Doctors of Paris," and constantly strives by foreign allusions and expressions to give a kind of local French colour to his stories. But the disguise is a thin one, and it is not to be wondered at that the medical confraternity of London regarded themselves as the objects of his satire.

Dr. Harvey, however, assures his readers, "whom," he says, "I omit complimenting with *courteous*, *gentle*, or the like, suspecting that the major part may prove of a contrary hew," that "my scope in publishing these pages is not to set up a beacon to light patients to any house, into whose business as I ever was negligent to introduce myself, so being introduced, the least indignity doth stimulate me to leave it, fees having less influence upon me than upon the least covetous conclavist; for I know no other vertue great riches are endowed with, than to make a man Justice of Peace among his own servants, and an Innkeeper or Host to his acquaintance, both which offices are rewarded with trouble in abundance, and repugnant to a quiet life."

If Dr. Harvey had scant respect for his readers, he entertained the most unbounded contempt for his brethren of the healing art. He abominates their principles, he execrates their practice, he makes the most terrible accusations against their moral characters, he regards them as altogether ignorant, covetous, base, and besotted,—a tribe of chartered quacks and murderers. What was the precise cause of all this wrath, what the difference that separated his system of medicine from theirs, is not very easy to discover through the darkness of his storm of words. But one of his chief accusations is the pernicious use of Jesuits' Bark, or quinine,—a remedy which he greatly

dislikes, admitting indeed that it stops ague fits, but denying that it really cures the disease, and affirming that it engenders worse diseases in the patient, as "dropsies, consumptions, scurvy, or twenty other distempers, that either render the party his whole lifetime extreamly crasie, or kill him out-right."

Take the following as a specimen of the author's style. The extract may show that Bob Sawyer, late Nockemorff, was but a plagiarist. "Certainly, if you look for Avarice, Envy, Malice, Pride, Ignorance, Slandering, Backbiting, Flattery, Lying, and Defrauding, you may find it in a *Conclave* Physician. Hypocrisie is an instrument he manages with incomparable dexterity. The Church door shall no sooner be opened, but Ecce M. Doctor, sitting in the most visible Seat, Grave, Deaf, Dumb, and immoveable, as if an *Apoplexy* of devotion had seized him, out of which his *Apothecary* is to raise him, by knocking at half sermon at his Pew-door to fetch him away post to a dying Patient, by which means he draws the Eyes of the whole Congregation after him; but instead of going to the pretended House of Visitation, they both drop into a *Cabaret*, there to pass the fatigue of a Forenoon *Sunday*. This knack of Confederacy is to be repeated several Dominical days, until it hath made an impression of the People that he is a man of importance and of great Physick business."

Again, "This trite Aporism, (viz. that there is nothing so hurtful or Poisonous, be it Spider or Toad, but hath its use) cannot be universal, unless it may comprehend the use of pretended Anatomical Physicians, which indeed is great and necessary in a populous Country, where neither Famine, Pestilence, or War have had any footing for many years. In this case men would devour one another, the place not being extensive enough to feed all, were it not, that Physicians by their *male* practice prevented the Plethory of Inhabitants. Moreover, they help off with a great quantity of the Manufacture of the Nation, as Mourning-Cloath, Sack and Claret, Crape, Flannen, Drugs, and a hundred Commodities more; and imploy thousands of hands, as Coffin and Grave-makers, Clerk, Sexton, Tailors, Shoe-makers, and what not."

"Ah, what would become of the undertakers else?" was the reply of the elder Mr. Weller to his son Samuel, when the latter endeavoured to comfort him on the death of his wife, by the statement that we must all die some time. F. T. M.

On the Reconcileableness of Specifick Medicines to the Corpuscular Philosophy. To which is annexed a Discourse about the Advantages of the use of Simple Medicines. By the Honourable Robert Boyle, Fellow of the Royal Society. London: Printed for Sam. Smith, at the Prince's Arms in St. Paul's Church Yard. 1685.

A MS. note on the fly-leaf describes this as "a curious and interesting work, containing many ideas taken as a nucleus by modern writers." It consists of two epistles "to the very learned Dr. F.," who, together with many of his medical brethren, hesitated or refused to accept the Corpuscular Philosophy, because it seemed to them irreconcileable with the "Specifick Vertues of Medicines." In order to combat this idea, Mr. Boyle endeavours, with great wealth of illustration, and in a clear and lucid manner, to explain rationally—"and not because they proceed upon Principles, such as substantial Forms, real Qualities, *Ideas*, or *Chaoses*, and the like,"—what is the action of Specific Medicines. The "Propositions" which he sets forth to this end, are:—1st. "That sometimes the Specifick Medicine may cure by discussing, or resolving the morbifick matter, and thereby making it fit for expulsion by the greater common shores of the Body, and the Pores of the Skin." Secondly, that "Sometimes a Specifick Medicine may mortify the over Acid, or other immoderate Particles that infest the Mass of Blood, and destroy their coagulating or other effects." Thirdly, that "Sometimes the Specifick Medicine may help the Patient, by precipitating the Peccant matter out of the Blood, or other Liquor (of the Body) that harbours it." Fourthly, that "Sometimes the Specifick Remedy may work, by peculiarly strengthening, and cherishing the heart, and by that means, or without it, the part affected." Fifthly, that "Sometimes a Specifick Medicine may do its work by producing in the Mass of Blood such a disposition as may enable Nature, by correcting, expelling, or other fit waies, to surmount the morbifick Matter, or other Cause of the Disease." Sixthly, that "Sometimes a Specifick Remedy may unite its Particles with those of the Peccant Matter, and with them constitute a *neutrum quid*, that may be easily prescrib'd, or not necessary to be expell'd."

The second letter is an invitation to the use of simple or specific medicines, on the following grounds:—First, because it is "much less difficult to foresee the operation of a simple than a very compounded Medicine." Secondly, because "*cæteris paribus* they are more safe than compound ones." Thirdly, because "the patient may, without burdening the stomach, or nauseating the Remedy,

take a larger Dose of the Medicine, or of that Ingredient of it wherein the Vertue chiefly resides." Fourthly, because "*cæteris paribus*, Simple Medicines are more easy to be procured than Compounded ones." Fifthly, because "one of the likeliest ways (and perhaps little less than absolutely necessary) to promote the practical knowledge of the *Materia Medica*," is the use of "Simpler Medicines as much as conveniently may be." "For whilst in one Receipt a multitude of Ingredients are mingl'd, if not confounded, 'tis almost impossible to know with any certainty, to which of the Simples the good or bad Effect of the Remedy is to be attributed, or whether it be not produc'd by a Power, resulting from the particular qualitys of all of them, united into one Temperament, and by its means acting conjointly, and, as the School men speak *per modum unius*."

It is worthy of remark that in modesty of tone, and courtesy of language towards those who differ from his views, these treatises of a really great philosopher contrast very strongly with the scientific writings of the age in which he lived. F. T. M.

A Mechanical Account of Poisons, in several Essays, by Richard Mead, M.D. Coll. Med. Lond. and R.S.S. Physician to his Majesty. The Third Edition, with large Additions. London: Printed for J. Brindley, Bookseller to his Royal Highness the Prince of Wales, at the Feathers, in New Bond Street. MDCCXLV.

Dr. Mead's theory is that the action of poisons depends on the manner in which they affect the "nervous fluid." "This fluid," he says, "so far as we can discover by its effects, is a thin volatile liquor, of great force and elasticity; being indeed most probably a quantity of the *universal elastic matter*, incorporated with fine parts of the blood, separated in the brain, and lodged in the fibres of the nerves. This is the instrument of muscular motion and sensation, a great agent in secretions, and indeed in the whole business of the animal economy. By the universal elastic matter I understand that subtile and active substance, diffused throughout the universe, which our great philosopher, Sir Isaac Newton, supposes to be the cause of the refraction and reflexion of the rays of light, and by the vibrations of which light communicates heat to bodies; and which, readily pervading all bodies, produces many of their actions upon one another."

He proceeds to consider, in six essays, the effects of the poison of

the viper, the tarantula, the mad dog, and of certain minerals and plants, of opium, and of venomous exhalations from the earth, poisonous airs and waters. He also considers the antidotes. To the first essay there is an appendix "containing anatomical observations on the Viper and Rattle-snake, and an account of some other venomous animals." F. T. M.

Pharmacopœia Reformata; or, an Essay for a Reformation of the London Pharmacopœia. London. 1744. Pp. 292.

The authority belonging to the Pharmacopœia of any country will doubtless present itself to many minds in so unquestionable a form, as might fairly be represented by the assertion—*nascitur non fit.* Such an idea has, in our time, received a somewhat rude shock by the unflattering reception given to the British Pharmacopœia of 1864, and its early supercession by that of 1867. To the student of pharmacology, such an opportunity of observing the behaviour of each formula under merciless winnowing is invaluable. It is not always as Hood wrote "the green leaves hang, but the brown must fly;" and yet this is the fate of many a leaf which we deem "sere and yellow," although it once made a brave show, and was received with unquestioning confidence by both physician and patient.

The volume named at the head of this notice carries us back for a century and a quarter, and we believe it will prove the existence at that period of sound and clearly defined views of those principles which should guide the construction of a Pharmacopœia.

The author of the "Pharmacopœia Reformata" does not make public his name, but the origin of the work is singular, being due to the fact that the committee of the College of Physicians appointed to review their Pharmacopœia, took into their counsels the whole of the members of the college, before the final decision was made.

Their own statement is that they "have thought fit to provide every member of the college with a copy of what they have hitherto done, that they might not any longer be deprived of the assistance of the whole body." The present volume is a criticism upon this draft Pharmacopœia.

The first half of the eighteenth century found the *materia medica* still loaded with the absurd remedies which had been accumulating for a few hundred years, and it is clear that one of the chief functions of a "reformation" was the unsparing use of the pruning-knife to these excrescences. Our author's preface commends the action of the committee as having "with a good deal of freedom and severity"

corrected many faults. It is stated of the college, "that in some of the former prefaces of their book, they have not disdained to ask and accept of the assistance of such apothecaries as appeared to them most skilled in this art."

The author lays down a number of general principles some of which appear to deserve quotation here. For instance:—

"That no compound medicine contain more ingredients than appear absolutely necessary.

"That such simples as are indigenous, or are easily to be procured in perfection, be preferred to all others.

"That a just medium be kept between superfluity and penury, with regard to the number of medicines."

Further principles laid down refer to the rejection of perishable compounds, as electuaries, etc.; also, they assert that the apothecary should not be put to needless labour or expense, and that there should be a sufficient reason for the rejection of any medicine.

The official report of the committee of the college states "that many medicines, whose names are still retained in practice, are universally prepared by the apothecaries in a very different manner from the directions of the Pharmacopœia." The alterations which they now propose are designed to remove all excuse for such deviations. Some of the explanations of the committee are by no means without interest at the present time. Take for instance the following:—

"Redundancy in composition must have had various causes. Whenever the powers of medicines were but imperfectly known, the most obvious remedy was to accumulate many of similar virtue, that the most efficacious might have the better chance to be of the number; mistaking the true virtues of any medicine would cause it to be improperly consorted with others; and any wrong opinion of the complex nature of a disease must equally occasion an irregular mixture of discordant ingredients. But what seems to have given rise to the enormous multiplicity in composition was the project of framing preservatives against poison. This gave the fairest pretence for that immeasurable length to which we find some of these antidotes drawn out. As such a medicine was to leave no known species of poison without a particular preservative inserted against it, upon this principle it became the ambition of every new compiler to exceed his predecessor in the multiplicity and variety of his ingredients, especially when these antidotes were to be wrought up into little less than universal medicines, and to protect likewise against the attacks of all diseases;* and this ostentation once began extended

* *Vide* GALEN: *De Antidot. in Princip.*

itself into all the parts of pharmacy, and compound medicines of every kind were admired for what they ought to have been condemned,—the false pomp of numerous and various ingredients; nor were schemes long wanting to justify a practice so well suited to gain veneration from the ignorant."

"The principal ingredient of a composition was sometimes to have its powers heightened, sometimes abated; sometimes the ingredient was accompanied with noxious qualities, which wanted correction; sometimes its operation was to be directed to a particular part, and perhaps other parts at the same time to be defended; add to this some modifications necessary in regard to the particular constitution of the patient; and each of these, with many other such fanciful intentions, were to be answered by the addition of one or more ingredients."

"This was the state in which we received pharmacy from the Arabians and Greeks upon the revival of letters in these western parts of the world."

Our author's criticisms shall now be judged by a few specimens. Let us commence with one referring to the sheet-anchor of remedies, opium. The committee proposed an altered process for opium purification, reducing the ample quantity of water hitherto used, and specifying that equal quantities of opium and water were to be used. Our author justly questions the expediency of the change, observing that "the original design of dissolving the opium in a large quantity of water, which was afterwards to be evaporated to the consistence of an extract, was not so much with a view to its purification with respect to its heterogeneous substances, as to correcting it of some noxious qualities which were attributed to its volatile and resinous parts, and which were by this means effectually separated from the extract."

Our familiar friend, extractum colocynthidis compositum, appears under the name of extractum rudii, although it is now shorn of the following drugs which were then included: viz., agaricus, radix hellebori nigri, rad. turpethi, cinnamomum, macis, and caryophyllum. Our critic indicates as needful the changes which were subsequently made, and which essentially sufficed to hand down the remedy to our time.

Spiritus cornu cervi is pointed out as a remedy in extensive use, but "hardly ever met with twice of the same strength in the shops." To correct this evil, it is suggested that a slight excess of the resultant sal cornu cervi should always be left undissolved in the "spirit." This was not a bad suggestion for a time when hydrometers and standard solutions for volumetric assay were alike unknown.

The book of which we are writing affords evidence that some of our "new lights" have served for the illumination of our ancestors, although for a while paled before the fiercer fire of a new favourite. Acidum sulphurosum, honoured in 1867 by reception into the B.P., appears in 1744 as "Gas sulphuris," being made as follows:—

"Sulphur in cochleari ferreo incendatur, et suspendatur super aquam in vase clauso. Cessantibus fumis, idem toties repetatur, donec aqua odore sulphuris accensi satis impregnetur."

Of mercurius sublimatus dulcis et calomelas our author remarks, "The name calomelas is very improperly given to this preparation, as it signifies a quite different one of a black colour."

Of aqua menthæ piperitidis it is said, that it has not yet been received into the Pharmacopœia, although frequently called for in the shops. Aqua seminum anethi is inserted by the committee for the first time, and provokes the comment "as its taste is to most persons exceedingly disagreeable, I believe it will not come into use."

At the end of the list of medicated wines is this note:—"Omnibus his vinis post colaturam addere licet spiritus vini Gallici vicessimam circiter partem ut tutiora sint à fermentatione."

When coming to mithridatium and theriaca Andromachi, the resolution of the committee to prune the "redundancy" of previous formulæ was put to its severest test, and the result goes to show that their own assertion of the past, that "all opinions were then built upon authority," was not altogether inapplicable to the present. The formulæ of the committee for mithridatium contains forty-nine ingredients, and after a learned disquisition upon the opinions of Andromachus and Galen, the committee refuse the claims of white pepper, orris, and asarum to a place. Theriaca Andromachi rejoices in still greater amplitude, having sixty-seven ingredients.

The author of the "Pharmacopœia Reformata" shows none of the complaisance exhibited by the committee of the College towards these ancient and dignified medicines, but he remarks of the course taken by the committee that "the extraordinary regard here paid to antiquity suits not an attempt to effectually improve this valuable part of medicine."

The pills regularly known as cocciæ minores receive a note from the committee, who state that they "can find no other original to the word cocciæ, than a corruption of the Greek *κοκκία*, which is only a general name for pills." Our author, however, is not at a loss in this case, and traces the pills to Rhasis, the Arabian, their name being derived from the Arabic word *cochia*, which signifies operative as a purge.

Pilulæ saponaceæ were composed of soap, licorice, and opium, and the doubt which must have presented itself to many minds as to the reason for selecting soap as an excipient, receives this explanation in a note by the committee. "Matthews's pill was originally composed upon this fantastical conceit: that soap of tartar was endued with an unaccountable faculty of correcting the noxious qualities of all vegetable poisons, and converting them into medicines of uncommon efficacy."

We now take leave of the "Pharmacopœia Reformata" of 1744, believing that it is but one of many old books on pharmacy deserving our notice, and from which we may glean, without being open to the charge

> "Of dropping buckets into empty wells,
> And growing old in drawing nothing up."

R. R.

Lecture Note Book of the late Mr. Richard Freshfield Reynolds. "Manuscript." Being "Extracts from a Course of Chemical Lectures delivered by Dr. Bostock and Mr. Aikin, in the winter of 1819." *Delivered at Guy's Hospital.*

At the end of the book are notes of a "second course," beginning Feb. 6th, 1820.

The notes are written with care and neatness.

A Complete Extemporaneous Dispensatory; or, the Method of Prescribing, Compounding, and Exhibiting Extemporaneous Medicines: In which is contained at large, the Doctrine of all the various Forms, both External and Internal, which are now in Use; Exemplified with many accurate Specimens of each. Translated from the Latin Original of the Learned Dr. H. D. Gaubius, Present Professor of Physick and Chemistry in the University of Leyden. London: Printed for J. Carter at the Black-Moor's Head, opposite the Royal Exchange. MDCCXLI.

Syllabus of a Course of Chemical Lectures read at Guy's Hospital. By William Babbington. M.D., F.R.S., Alexander Marcet, M.D., F.R.S., Physicians to the Hospital, and William Allen, F.R.S. and F.L.S. London: Printed by William Phillips, George Yard, Lombard Street. 1816. Pp. 145.

This book was the text-book of the late Mr. Richard Freshfield

Reynolds, whilst studying at Guy's Hospital. In a pocket inside the cover of the book are two perpetual tickets for two courses of lectures, one on Experimental Philosophy, by Mr. Millington, 1819; and the other on Chemistry, by Dr. Bostock and Mr. Aikin, in 1819.

Pharmacopœia Londinensis; or, The New London Dispensatory. In Six Books. Translated into English for the Public Good, and fitted to the whole Art of Healing. Illustrated with the Preparations, Virtues, and Uses of all Simple Medicaments, Vegetable, Animal, and Mineral; of all the Compounds, both Internal and External; and of all the Chymical Preparations now in Use. Together with some choice Medicines added by the Author. As also, The Praxis of Chymistry, as it's now exercised, fitted to the meanest capacity. The Eighth Edition, Corrected and Amended. By William Salmon, Professor of Physick, at the Great House, near Black-Fryars Stairs. London: Printed by J. Dawks, for G. Conyers, J. and B. Sprint, in Little Britain, and sold by T. Varnam and J. Osborn, at the Oxford Arms in Lombard Street. MDCCXVI. Pp. 796.

Arranged in six books:—I. Of simple Vegetable Mendicants.—II. Of Animals.—III. Of Minerals.—IV. Of Compounds Internal.—V. Of Compounds External.—VI. The Practice of Chymistry.

Book ii. is full of quaint matter, as the following will show:—

"The powdered hair of a living man good for jaundice, etc:—1. The ashes stops bleeding. An oil distilled from it with honey, causes the hair to grow again on bald places. 2. The nails in pouder' or infusion they cause vomiting, great sickness at stomach, and giddiness in the head. The powder also cures dropsy."

"℞ Of the Pouder of the parings, ℥i; Wine a Pint, digest till it turn to slime, filter, and add spirit of wine, ℥ii; of which give from ℥i to ℥i to the uses aforesaid."

"To cure consumption take the hair and nails of the patient, cut them small, and put them in a Hole in the Root of a Cherry Tree, and then stop it with Clay." Gout is cured by giving the same to birds in a roasted egg, or put into the hole bored in the body of an oak or plum-tree, or mixed with wax and introduced into the body of a live crab.

Spittle cures venomous bites, pimples, etc. Human blood drank hot cures epilepsies, according to some, but says the author, "it is very dangerous."

Here is a prescription!

"℞ The blood of a young man in the spring time, digest 40 days, then distil in Ashes or Sand, by an Alembick, so you will have Water and Oil; rectify the water in B.M., the Oil in a retort, drawing them off nine or ten times, till it be of a red colour."

It is cited as a cure for consumptions—dose ℥i.

Man's blood made in the form of a "balsam" "is of strange force in the gout."

Of mummies there are five kinds: 1. Artificial. 2. Sun dried (found in the desert). 3. Egyptian (embalmed). 4. Arabian. 5. Artificial.

An artificial mummy is made thus: "Take the carcase of a young man (some say red hair'd), not dying of a disease but killed; let it lie twenty-four hours in clear water in the air, cut the Flesh in pieces, to which add Powder of Myrrh and a little Aloes. Imbibe it twenty-four hours in Spirit of Wine and Turpentine, take it out, hang it up for twelve hours; imbibe again for twenty-four hours in fresh spirit, then hang up the pieces in a dry air, and in a shady place, so will they dry and not stink."

Aqua divina consists of a person violently killed, cut to pieces, and distilled in a retort! It has a magnetic power!!

Preparations of bones, skulls, brains mixed with lavender, cowslip, sage, mistletoe, etc., form a "noble antepileptic;" and hearts are mentioned. The preparations of beasts, too, are numerous. Amongst other strange things, distilled soot has a wonderful curative power.

J. C.

Pharmacopœia Officinalis et Extemporanea; or, a Complete English Dispensatory, in Two Parts. Theoretic and Practical. Part I., in Two Books.—Book I. Of the Definition, Subject, General Intentions, Media, Instruments, and Operations of Pharmacy.—Book II. Of the Distribution into proper Classes, General Nature, and Medicinal Virtues, etc., of Simples. Part II., In Five Books.—Book I. Of the Preparation of Simples.—Book II. of Saline Preparations.—Book III. Of Metalline Preparations.—Book IV. of Officinal Compositions; containing all the Prescriptions of the London and Edinburgh Pharmacopœias, according to the last Alterations thereof; together with those of the Author's, and the present Practice, which claim any notice.—Book V. Of Extemporaneous Prescriptions; which are therein disposed into proper

Classes according to their curative Intentions. By John Quincy, M.D. The Fifteenth Edition, much enlarged and corrected. London: Printed for T. Longman, in Paternoster Row. 1782.

In this well-known book will be found "ambergris, crabs' eyes, ivory and hartshorn shavings, crabs' claws, pearls, ruby, saphire, lapis lazuli, vipers, snails, earthworms, millepedes, stercus porcinum, skinks, Oriental and Occidental Bezoars, hermodactyls, mandrake, houseleek, dodder, Adeps anseris, A. camis, A. hominis, A. viperæ, A. ursi, and also formulæ for their preparation." J. C.

Free Thoughts on Quacks and their Medicines, occasioned by the Death of Dr. Goldsmith and Mr. Scawen; or, a candid and ingenuous Inquiry into the Merits and Dangers imputed to Advertised Remedies: . . . In which, an investigation of the nature and origin of their composition has been attempted; and the degree of confidence they deserve, ascertained. . . . Wherein, also, have been occasionally interspersed some few animadversions tending to defend Minerals in general, and exculpate Mercury and Antimony in particular, from the ill-judged and ill-grounded aspersions thrown against them; by proving the superiority of the productions of the Mineral, over those of the Vegetable Kingdom. Dedicated to the Legislature in general, or, both Houses of Parliament. Interest Reipublicæ, cognosi malos. Cicero. London: Printed for J. Wilkie, No. 71, *St. Paul's Churchyard, and Mr. Davenhill, No.* 30, *Cornhill. MDCCLXXVI.*

Pharmacopœia Collegii Regalis Londoni. Londoni, Impensis Tho. Newcomb, Tho. Basset, Job. Wright, et Ric. Chiswell. MDCLXXVII.

The Distiller of London. Compiled and set forth by the Special Licence and Command of the King's Most Excellent Majesty; For the Sole Use of the Company of Distillers of London. And by them to be duly Observed and Practised. London: Printed by Thomas Hughes, Stationer, in Broad Street; for the Company of Distillers. MDCCXXV.

Pharmaceutice Rationalis. Sive Diatriba De Medicamentorum Operationibus in Humano Copore. Auctore Tho. Willis, M.D. in Univ.

Oxon. Prof. Sedleiano, nec non Coll. Med. Lond. et Societ. Reg. Socio. Editio Tertia. Oxoniæ E. Theatro Sheldoniano, Prostant apud Ric. Davis. 1679.

Part I. Tractatus De Simplicium Medicamentorum facultatibus. A Treatise of the Nature and Qualities of such Simples as are most frequently used in Medicines, both Purging and others. Methodically handled, for the benefit of those that understand not the Latine Tongue. To which is added many Compound Medicines for Diseases incident to Mankind. As also two Alphabetical Tables, very necessary for the Reader. Together with the Explanation of all hard words, or Termes of Art, whereby the Vulgar may the better understand it. By Robert Pemel, Practitioner in Physick, at Cranebrooke, in Kent. Turpis est calamitas Medicamento purgante dato hominem occidere.—Hippoc. de Med. Purg., fol. 98. *London: Printed by M. Simmons, for Philemon Simmons, at the Guilded Lyon, in St. Paul's Church Yard.* 1652. Sq. 8vo.

The preface, Sept. 16, 1651, is dedicated "To the kinde Reader." It begins: "Courteous Reader, as the knowledge of diseases is most necessary and usefull for such as take upon them the noble art of physick, so no lesse profitable is the knowledge of simple medicines and their nature. For it is most true, he onely cures well that rightly knows; he that rightly knows diseases and their causes, as also the vertue of simple medicines, he cures best."

Then follows, list of authors made use of; alphabetical table of simples; explanation of hard words, "whereby the vulgar may the better understand it;" list of works on sale by the publisher, and list of errata. The matter is arranged thus for an example:—

De Absynthio. Of wormwood. The names; the temperament,—"It is hot in the second degree, and dry in the third, very bitter and cleansing, yet binding and strengthening." The duration,—"It will keep good a year." The inward use; the manner of administering in different complaints. An infusion made with "wormwood, fumiterry, of each a handfull, raisons of the sun, two ounces, and a gentle decoction in three pints of posset drinke to two pints, or two and a halfe," and strained, is said to be good against melancholy. "Of such things as are made of wormwood we have wormwood water, juice, spirit, wine, extract, conserve, syrupe, trosses, salt of wormwood, chymicall oyle, and oyle by infusion." Last follows the dose. Amongst the simples we have:—agaricus, ammoniacum, socotrine aloes, aristolochia longa and rotunda, assafœtida, saffloweer seeds,

cassia fistula, described as a "black cane having a black substance therein;" red coral, hartshorn and ivory, elaterium, euphorbium, galanga, gamboge, hermodactylis of which he gives the following description, "whitish roots about the bignesse of a chestnut, smooth, flattish, and sharp at the one end, but somewhat fuller at the other, growing upon I know not what plant, comming from I know not what place, and truly may be called *opprobrium medicorum*, the shame or disgrace of physicians." A "poultes" made of cow-dung, hog's grease, and hermodactyles, is recommended for the "gowt;" azure stone hung about the neck of children as an amulet keeps them from "fearfulnesse," sharpens the sight, in women prevents fainting and hinders miscarriage; lign. aloes as an anthelmintic and for strengthening the brain, "which it doth wonderfully corroborate and dry;" myrabolans, opoponax, sagapenum, amber, basil, water lily; rosemary leaves, taken in a pipe of tobacco, good for a cough; butcher's broom good in calculoid diseases; mistletoe "hung about the neck of such as have the falling sicknesse to mitigate their fits."

Mummy: of this he has the following:—The names and temperament:—"Mummie is the body of a man or woman embalmed, and brought chiefly from Ægypt, or Syria adjoyning. It is called in Latine *Mumia*, in English Mummie. It is hot and dry in the second degree. The Duration.—It will keepe good many years. The inward use.—It easeth the paine of the head coming of cold and moisture, and is good in palsie and crampe, falling sicknesse, swimming of the head: it is cordiall for the heart and preventeth the danger of poison, or the venome of the scorpion and other serpents, etc." The preparations mentioned are "Tincture, or Extract of Mummie," and "Sympatheticall Oyntment." J. C.

The Elements of Pharmacy and of the Chemical History of the Materia Medica. By Samuel Frederick Gray. London, 1823. Pp. 296.

The author of "Gray's Supplement to the Pharmacopœia" gives weight to any other book bearing his name. The preface to "The Elements" alludes to "The Supplement" as having supplied a manual of the art of preparing officinal medicines, and "also those cheap imitations of them which are required by dispensaries and the contractors for doctoring the parish poor, or plantation slaves. The present work is intended to explain the principles upon which the processes mentioned in that work are founded."

The author exhibits, in the interest of students, much concern about mnemonics, pointing out that the system of "signatures" had

been the method chiefly adopted by medical students, "and which was more necessary formerly, when the list of drugs kept in the shops amounted to above two thousand, or full ten times as many as at present, and the preparations were equally numerous." Illustrations of these "signatures," or resemblances, occur in the cases of rhubarb and saffron, the yellow colour of which suggested bilious diseases; the black spot on the corolla of eyebright indicated its use in diseases of the eyes; as did the form of cassia fistula its employment in emptying the intestinal canal. At the same time it is pointed out that some of the disciples of Paracelsus did not accept the doctrine of signatures merely as an aid to artificial memory, but as being "the language of the Creator to man, impressed on all natural substances to show their use."

Weights and measures receive a full consideration, and we note the following as "things not generally known:"—1stly. That the Jews used the egg of the hen as a standard of concave measure, it being estimated to hold an ounce and three-quarters troy of water. 2ndly. That medical measures were formerly made of horn.

The chapter on furnaces and "fewel" makes one thankful to live in the days of steam and gas, rather than in such "good old times."

Like many other old books, this will lessen the pretensions of some things which claim to be (as we saw it phrased in a shop window the other day) "new novelties." Thus, it is said of charcoal powder,—"Internally, it is given to ʒj, as an antiseptic tonic, instead of Peruvian bark; and is also mentioned as an excellent medicine in obstinate constipation."

Samuel Frederick Gray was a believer in the transmutation of metals, and records with evident satisfaction many instances of the production of gold. He attributes the growing incredulity of the world to "the satire of Addison, Steele, Swift, and their tavern companions."

We may well question whether there are many who remember that "nitrate of lead is used to impregnate wooden sticks, which, being ignited at one end, consume gradually, and are employed by the French to fire artillery, instead of quick match."

Epsom salt was at this time displacing the older medicine, Glauber's salt, and its source was sea-water.

Gray used very plain language, and was a man with strong dislikes, these being chiefly manifested against opinions and views of French origin. Of veratrine he says that it "is considered as an alkali, chiefly because the discovery of a new alkali is a better feather in a man's cap than that of a new rosin."

Of secale cornutum we are told that "the country midwives in France have long used it as a stimulant to promote the progress of labour, and it has lately been attempted to be introduced into regular practice in this country; but the difficulty of obtaining it impeded its becoming fashionable before it had palled upon the ear."

It would seem as if the introduction of the pill-machine was modern, as Gray says that division is performed "by rolling it into a cylinder as uniform as the eye will allow, of such length that a common rule divided into inches and parts, being applied to it, will allow the dispenser to divide it into the required number of pills." Can any one tell us who invented the present pill-machine?

The term "elixir" was applied to concentrated remedies which were otherwise called "drops." They were originally the chemical remedies which contested with the emulsions, juleps, and mixtures then loading the table of the sick man's room. Gray says, "It is no wonder that the apothecaries looked upon them with an inimical eye. Even now they are as unwelcome to his sight as the ghosts of their inventors would be. The physicians who venture to prescribe them are marked as enemies, and by no means entitled to their good word; hence they can be ordered only by those who are perfectly independent in purse and mind, or who rely on other than professional patronage."

The "Elements of Pharmacy" has had its day, and during that it has supplied the student with a useful manual, executed in a painstaking and careful manner. R. R.

The Treasure of Euonymus, conteyninge the wonderfull hid Secretes of Nature, touchinge the most apte formes to prepare and destyl Medicines, for the conservation of helth; as Quintessence, Aurum potabile, Hippocras, Aromatical Wynes, Balmes, Oyles, Perfumes, garnishing waters, and other manifold excellent Confections. Whereunto are joyned the formes of sondry apt fornaces and vessels, required in this art. Translated (with great diligence and laboure) out of Latin, by Peter Morwyng, felow of Magdaline Colleadge, in Oxford. Imprinted at London by John Daie, dwelling over Aldersgate, beneath St. Martines. Cum privilegio ad imprimendum solum. 1559. (Black-Letter.)

We gather from the preface that the author was a Dutchman, for he speaks of "our Dutch tung."

This translation is interesting as illustrating the structure of the English language in the sixteenth century, its residue of now obsolete

or altered Saxon words, its importation of words new and strange at that date, its vocabulary of words whose meaning has since been changed, its listless and uncertain spelling.

The old words *bren* and *brenning* occur here; *bren* had other spellings, such as *byrn*, before it came to its present form *burn*. That it was just about this time in transition stage is indicated by the fact that the word is printed in one or two instances *burnynge*, and *burnnynge*, and even *burning*.

Cauterium and *filtrum* were new in 1559, as shown by their semi-classical form.

Words whose meaning has been changed since the publication of this book abound throughout its pages; in the first paragraph moist things are said to be *extenuated* into a vapour. We still talk of extenuation in the sense of thinning off, diluting down, rendering less massive or of lighter import; but it is in a figurative way, not actually.

It is difficult to choose examples of spelling, they are so numerous. The word meaning to burn, is spelt many different ways, as already shown; in addition we have (on the same page) *burntnes*, and the brave old Anglo-Saxon *brentnesse*. Seeds are sometimes *sedes*, *seedes*, and *siedes*. A man's nose is occasionally *noos*. Heat is spelt in two other forms besides, *heate* and *heet*. For coals the author wavers between *coles* and *cooles*.

In the first chapter we are reminded of the original signification of the word distillation. "Destillation, not distillation (as lerned doe write), is the drawying forthe of a thinner and purer humor out of a juise by the force of heate: *Silvius*. Destillation by ascention, or going upwarde, is when the vapours or fume is carried up, and be there gathered together into water, and so droppe doune." Later in the book the expression "streined or destilled by a filtrum" occurs. And in another place capillary "Destillacion by a filter, or a slip of wollen cloth," is described. In this process the liquor in a vessel is conveyed into another set beneath, by hanging over the side of the first a filter, or strip of cloth, which carries over or "destils" the liquid by capillary action. In all these cases the word means dripping, or "droppinge doune."

The scope and object of the book are sufficiently explained in the title; the style, by the extracts supplied in this notice. In the authors' words, "it is sufficient for a man of wit and activitie, skilful in the nature of simple medicines, spices and sauces, or seasoninges, to have a certain few formes, as it were prescribed, which he many wayes, as occasion and divers circumstances shal serve, may vary and alter at his pleasure."

W. A. T.

The Chemical Essays of Charles William Scheele. Translated from the Transactions of the Academy of Sciences at Stockholm. With Additions. London: Printed for J. Murray, No. 32, Fleet Street; W. Gordon and C. Elliot, Edinburgh. 1786.

Among the very first preparations with which a juvenile pharmacist entering on the process of initiation becomes acquainted, is a colourless, watery looking liquid, but of such dangerous and at the same time sensitive qualities, that by all careful physic-dealers it is perpetually immured in the seclusion of a dark closet. It is known as Scheele's acid. However little curiosity he may have about such matters, he cannot avoid shortly afterwards making the discovery that it is a form of what subsequently became entitled prussic acid, and finally hydrocyanic acid. If his desire for knowledge prompt him to seek further information about this wonderful substance, and especially concerning the name it bears, he becomes the recipient of a moral lesson which the less inquiring novice altogether misses. Those who have read the story of Scheele's life and chemical labours, see united in one man, indomitable perseverance, eminent scientific ability, and practical business qualities. Diligent as an apprentice, active as an assistant, he laid the foundation, in a good store of the chemical knowledge such as it was in the earlier portion of his life, for that series of magnificent discoveries which rendered him in his later years illustrious.

But these immortal discoveries of his took him not out of his apothecary's shop; in the dispensary he still spent the greater part of his time, and it was actually at the period when his most brilliant work was going on, that he was engaged, and successfully, in working up into a flourishing business that which, when he entered upon it, was but a fading concern.

Since the *Pharmaceutical Journal* (October, 1863) already places in the hands and before the eyes of pharmacists, the story of Scheele's life and the lessons it conveys, it will be the object of this notice, merely to set forth the purport of the most important of the essays in this volume.

Dr. Thomas Beddoes, the editor, afterwards professor of chemistry at Oxford, and the friend of Sir Humphrey Davy, was at the date of this publication a student at Edinburgh. The essays were translated by a foreigner, whose name is not mentioned, and were handed over in manuscript to Beddoes, who corrected the English. "To Charles William Scheele, Apothecary at Koeping in Sweden; this attempt to extend the knowledge of his discoveries is respectfully inscribed."

Very early in the preface Beddoes cites the observation, the paraphrase of which as applied to Davy and Faraday is fresh in the recollection of every one. The original remark was by a near relative of the Swedish chemist, Bergmann, *that the greatest of Bergmann's discoveries, was the discovery of Scheele.*

The subject of the first essay (1771) is "Fluor Mineral and its Acid." This was not the first work published by Scheele, but is distinguished by its accuracy and important results. In it he describes the formation of hydrofluoric acid by the action of vitriolic acid upon fluor spar; he shows that "Fluor consists principally of calcareous earth, saturated with a peculiar acid, the nature of which we investigate hereafter." "Art is" indeed "long." It is curious to see, almost exactly a century afterwards, an elaborate paper by an English chemist, describing the properties of hydrofluoric acid (Gore: *Proc. Royal Soc.*, 1869). "Pure clay, or as it is generally called earth of alum, and iron, seem to be accidental ingredients." He also proved satisfactorily that the white matter which during the processes of distillation was deposited in the receivers and in the neck of the retort was siliceous earth; but the source of it seems to have been a puzzle to him, and he is led, or rather tumbles, into the conclusion that the fluor acid uniting with vapour of water forms this siliceous earth. This mistake he was clever enough to correct by a research published a few years after.

In 1774, the essay, fifth in this volume, on manganese, appeared. The effects of the acids upon manganese are successively described; those of common muriatic acid are especially interesting. He describes the experiment in which he collected the "dephlogisticated muriatic acid" (chlorine), which results from their mutual action. The bladder he used to collect the gas was rendered yellow, and there was a "very sensible pungent smell, highly oppressive to the lungs, and resembling the smell of warm aqua regia." He also observed that the corks exposed to its action became yellow; litmus paper and coloured flowers were rendered white. "Meanwhile the water in the vessel (containing the gas) was changed into a weak but pure muriatic acid." Cinnabar was changed into corrosive sublimate; all the metals were attacked.

By heating manganese, Scheele obtained oxygen; but he makes very little of it in this essay. There is scarcely an experiment described which does not record a discovery of importance. Scheele was strongest in experiment; when he slid into theory he was far less successful. He seems to have adopted most of the theories current in his day, and he does not appear to have held any peculiar

views on general and fundamental principles. He was an experimentalist; it was the real business of his life, and he stuck to it.

Arsenic forms the subject of another essay. By the action of a mixture of muriatic and nitrous acids upon white arsenic, he procured a residue of acid of arsenic (arsenic acid), which he distinguished from white arsenic, but showed by experiment that it was as fatal in its poisonous action. Farther on is given the method of preparing the green pigment celebrated under the name of Scheele.

Essay VII., entitled "Remarks upon Salt of Benzoin,' bears the date 1775. After showing the inefficiency of the processes for extracting benzoic acid by simple sublimation or lixiviation of the benzoin, the author describes the plan which is adopted down to the present day. He boils his benzoin with lime, and precipitates the benzoic acid from the filtered solution by adding to it muriatic acid.

An essay on the calculus vesicæ (1776) shows that Scheele had encountered uric (lithic) acid, and knew that it was an acid. Another (1778) gives the process for preparing calomel from mercurous nitrate and common salt, and, belonging to the same year, a method of preparing the pulvis algarothi (oxychloride of antimony). An essay upon molybdena is followed the next year by one upon plumbago, in which he points out distinctions between these two substances, and pronounces his conviction that plumbago is a kind of mineral sulphur or charcoal.

Milk and its acid, tungsten, ether, and vinegar, form the subjects of several of the dissertations in this collection, which also includes the celebrated treatises on Prussian blue and on glycerine, which are among the finest of his performances. Glycerine he produced by boiling together litharge, water, and some fat; the water at the end of the operation being poured off and evaporated:—the very process by which the greater part of the glycerine of commerce has ever since been prepared.

To enumerate the whole of Scheele's discoveries, would be to range over the whole of chemistry. There is probably no more modern chemist whose researches will bear comparison, on the score of fertility, with those of this laborious worker.

While men of science look back with admiration into the little laboratory at Koeping, furnished with no more elaborate apparatus than the moderate means of its master could provide, the chemist and druggist may view with pride, and no less with gratitude, a retrospect which shows him one of his own order ranking side by side with Cavendish and Priestley and Lavoisier.

Written for J. C. B. by W. A. T.

The Hermetical Triumph; or, the Victorious Philosophical Stone. A Treatise more compleat and more intelligible than any yet Extant, concerning the Hermetical Magistery. Translated from the French. To which is added, The Ancient War of the Knights, being an Alchymistical Dialogue betwixt our Stone, Gold, and Mercury; of the true Matter of which those who have traced Nature do prepare the Philosopher's Stone. Translated from the German. London: Printed by F. Noble, at Otway's Head, St. Martin's Court, near Leicester Fields. 1740.

Opposite the title-page there is a very elaborate frontispiece.

"The Ancient War of the Knights" was "composed originally in the German tongue by a very able Philosopher," and is given in duplicate in this book.

One English translation, which is to be found towards the end of the book, was made directly from the German. The other English translation was made from the French version, which itself had been made from a Latin translation of the original German. As might be expected, the English direct from the original German is vigorous and terse, whilst the other is comparatively weak and verbose.

The "War" consists mainly of a discussion between the Stone and Gold as to their relative merits; the part taken by Mercury being very slight, and confined to a single expression of assent made to a remark made by Gold.

A very curious passage, warning the reader against attributing the plain and literal sense to works of this kind may be quoted from the dialogue. "But when they name barely the name of Gold and Mercury, they do it to hide the Art from the senseless and the unworthy, knowing very well that such only dwell upon Names and written processes, without meditating further upon the foundation of this Matter. But the Prudent and Diligent read with Prudence, and ponder how one squares with the other, out of which they get a Foundation; finding thus by speculation, and from the Philosopher's sentences, the true matter which no Philosopher ever named and described openly by its true Name."

That the writings of "true Philosophers" should be somewhat hard to understand, need therefore not occasion much astonishment.

There is gold, such as we find it, and there is an ideal gold such as we never find it, and which never appears to be endowed with infinite perfections. With our modern ideas and modes of thought it is hard to bring our minds into a proper frame for the study of these old alchemical writings.

Written for J. C. B. by PROFESSOR WANKLYN.

The Hermetical Triumph. (Second Notice.)

Some, smitten with the weird imagination of the German, or led captive by the delicate fancy of the French fairy tale, have not hesitated to convey the truths of modern science in this attractive garb. When sneerers would banish these productions to the nursery, they are unmindful that in this manner the Great Teacher taught.

A beautiful little book closes this series, being a conscientious treatise upon Alchemy. The author believes his subject; he thinks in his heart of hearts that *our* stone has marvellous, all-subduing properties. For there are two—the stone of the philosophers and the philosophic stone, "which is the same as the former when by the secret Magistery it is exalted to the perfection of the third order, transmuting all imperfect metals into pure Gold or Silver, according to the nature of the ferment adjoined to it."

So Gold and Mercury league themselves together to confound the Stone with argument, or settle him by blows. Gold upbraids his enemy; the Stone answers thus—"Why are you not rather angry with God, and why do you not ask Him, for what reasons He has not created in you what is found in me?" Gold replies that God Himself had given him honour, reputation, and glittering brightness, had made him a metal unchangeable, therefore the world ran after him: but the Stone was but a fugitive and cheat. "True," says Stone, "I admit your excellence; but you are not that Gold of which the writings of the Philosophers make mention, but that Gold is hidden in my bosom. Tis true, I own it, I flow in the fire (and I abide not there), nevertheless you very well know, that God and Nature have given me this quality, and that this must be so; forasmuch as my fluidity turns to the advantage of the Artist, who knows the way how to extract it; know, nevertheless, that my soul remains constant in me, and that she is more stable and more fixt than you are, altogether Gold as you are, and more than all your brothers and all your companions are. Neither Water nor Fire, be they what they will, can destroy her, nor consume her, though they should act upon her during as long a time as the word shall last."

The Stone also relates how they mix him with foreign substances, totally misunderstand him, and of necessity come to grief. Gold falls back upon ancient authority, and quotes Aristotle, Avicenna, Pliny, Serapion, Hippocrates, Dioscorides, Mesne, Rasis, Averroes, Geber, Raymund Sully, Albertus Magnus, Arnold of Villa Nova, Thomas Aquinas, and many others. Mercury finds courage for a remark, and observes that goldsmiths could do nothing without himself and Gold. Whereat the Stone laughed—how foolish was it to

imagine that the ancient philosophers wrote so that they could be understood in a common way! Never should we interpret their words according to the letter. Gold is of opinion that they meant what they said, and that the artists cited had not written lies; but the Stone asserts that only by reasoning and meditation can it be discovered what the matter of the philosophers is, among whom there is not any one to be found who would show it, or make it known openly, and by its proper name. Then follows an elaborate discourse, mysterious and little to the point. The Stone sums up:—"Yet (you ought to know) that all which the philosophers have written in figurative terms about the Work, ought to be understood of me only, and of no other thing which is in the world; because there is only me who can perform that which they say, and that without me it is impossible to make any true Gold, or any true Silver." The contest waxed hot and furious. Stone had the last word:—"Geber says thus: There is a Sulphur in the profundity of Mercury, which cooks it, and which digests it in the vein of the mines, during a very long time. Thus you see, my dear Gold, that I have fully demonstrated to you that this Sulphur is only in me, because I do all myself alone, without your help, and without that of all your brothers and of all your companions. I have no need of you; but you all have need of me, for as much as I can give perfection to you all, and raise you all above the state which Nature has placed you in." Gold and Mercury trembled with indignation; battle was given; but *our* Stone fought them both, overcame, and destroyed them. He swallowed them up, both one and the other, in a manner that there remained no sign whereby one might know what was become of them.

"Thus, dear friends, who have the fear of God before your eyes, what I tell you ought to make you know the truth, and illuminate your minds as much as is necessary to understand the foundation of the greatest and the most precious of all treasures, which no philosopher has so clearly explained, discovered, or brought to light. You have then no need of anything else. This only remains, that you pray to God that He would make you arrive at the possession of a jewel which is of an inestimable value. Be upright of heart, and propose to yourself (in your work) an honest end; otherwise God will grant you nothing; for He doth not communicate so great a gift, except to those who will make a good use of it; and He depriveth them thereof who design to make use of it to commit evil. I pray to God that He may give you His holy blessing. Amen." A commentary on the above is furnished in a conversation between Eudoxus, an adept, and Pyrophilus, a learner. "A Letter to the true

Disciples of Hermes containing six principal Keys of the secret Philosophy" is subjoined; as well as a second translation from the German, of the "Ancient War of the Knights." He would be slow indeed who did not recognise known chemical reactions veiled in this allegorical language, or failed to allow, not only that there are "sermons in stones," but there is "good in everything."

Written for J. C. B., by JOSEPH INCE.

One hundred volumes are included in this collection: those only are noticed of special interest. Some reviews in duplicate have been retained.

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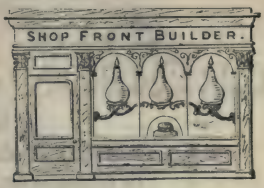
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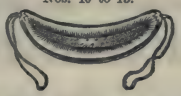
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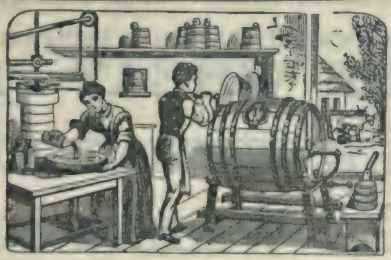
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